The Kraft Pulp Situation

A TABULATION of the annual sulphate pulp consumption in the United States during the period 1926-1936 inclusive was given in a recent survey on the paper industry by Shields and Company, New York. The figures in this tabulation revealed that the consumption during 1936 was nearly two and three-quarter times the consumption of 1926. They also showed, with only two exceptions, a gradual and consistent increase each year throughout the entire period. The two exceptions were for the years 1932 and 1934, each of which years had slightly lower consumption figures than for the year previous.

The same table also included percentage figures on the amount of sulphate pulp consumed that was made in this country. These figures rose from a low of 57 per cent in 1926 to a high of 73 per cent in 1932 and rested at 71 per cent in 1936.

Year	Sulphate Pulp Consumed, Tons	Per Cent Made in U. S.
1926	913,024	57
1927	997,438	61
1928	1,217,573	64
1929	1,358,181	67
1930	1,371,847	69
1931	1,453,501	71
1932	1,402,954	73
1933	1,814,785	69
1934	1,781,773	70
1935	2,079,064	72
1936	2,489,823	71

Reference likewise was made in the survey to nearly 1,000,000 tons of new productive capacity that is scheduled to be in operation within the United States in the next two years and to the enlargement of foreign sulphate pulp capacity. In commenting on this increase in productive capacity, the survey states that the combination of new domestic and new foreign pulp mills would increase the supply available for domestic consumption to more than 3,660,000 tons or 50 per cent above actual consumption.

The competitive advantage of the mills in the South also was touched upon. Low cost pulpwood and lower transportation costs were the two factors cited in favor of southern mills. Pulpwood costs during 1935 in the South, according to figures quoted, were less than 50 per cent of those for domestic spruce and only about 70 per cent of those for domestic and imported hemlock. In regard to transportation costs, the survey stated that southern sulphate pulp could be laid down in New York with water transportation and in Chicago by rail at less than 60 and 80 per cent respectively of the costs of Lake States pulp. A slight advantage in delivered cost of pulp was granted Pacific Coast mills over southern mills when delivering to New York by water and over the Lake States mills when delivering by rail to either New York or Chicago.

Over a period of years, continues the survey, still further expansion will be required in the American pulp and paper industry, the South, the Pacific Coast and eventually Alaska being the areas of growth in production.

+ EDITORIAL +

Selling to Industry

HOW many industrial salesmen call upon your organization a year? Have you any idea how much time is spent by the various executives of your company with these men? Do you know whether this time is profitable to you? Have you ever felt that it might be necessary to close the door to some of them but just haven't had the audacity to do it or have refrained from doing it for some reason or other?

There is much to be said on the good that comes to your organization from such contacts when made by the right sort of salesmen. Maybe you can point to a reduction in production costs or an improvement in quality of your final product because of the timely suggestion made by one of these men. Maybe he convinced you or one of your associates of the need for his particular line of service in your mill, whether this service was in the form of new equipment, chemical raw material, or something else, and that he delivered when given the opportunity to demonstrate. Maybe you can cite numerous similar experiences with other men and can evaluate rather definitely the part they have played in warming the cockles of your heart with their practical suggestions.

Then, of course, there is the other type of industrial salesman who can only be chalked up on the debit side of the ledger. It hardly seems possible, but, according to W. P. Winings, Manager of the Mechanical Goods Department of the Goodyear Tire & Rubber Company, Inc., sixty-eight per cent of the industrial salesmen calling on the members of a buyers' association might just as well have stayed away. This comment was based on the findings of a recent survey conducted by the association which revealed that fifteen per cent of the salesmen did not know what their products would do for the buyer, and could not answer simple, non-technical questions about the product; that twenty-five per cent talked on extraneous subjects; and that twenty-eight per cent offered no information of interest or value. Suppose a survey along somewhat similar lines was made by a group representing some of the more important paper consuming interests, such as printers, box makers and converters of all kinds relative to paper salesmen. Would the results on your own sales force set-up be satisfactory to you whether you make use of a direct mill sales staff or whether your sales are handled through a jobber or merchant?

Who Is To Blame?

A PROFESSOR of chemical engineering in one of the country's foremost technical colleges stated recently that he had never been inside a pulp and paper mill. The statement was not made boastfully but rather sorrowfully. He mentioned that he was born in one of the most important pulp and paper producing states of the country; that he taught in one of that state's technical schools for a period of over twenty years prior to assuming his present duties; that a number of mills were within a comparatively short distance of the institution and probably could have been visited at any time; and that graduates of that college as well as of the college with which he is now connected have found themselves making their livelihood within the pulp and paper industry.

What comments he has made could probably be duplicated by many professors in other institutions of higher education.

Are they sad commentaries on the lack of interest of university professors in the scientific and more practical phases of business, and, in this particular case, in an industry that literally teems with problems that should command the attention of scholars and research workers in practically every field of scientific endeavor? Or are they due to the lack of interest on the part of those associated with the pulp and paper industry in colleges and universities and with the work which they are doing?

No attempt is going to be made to place the responsibility for this laxity. All that is going to be said is that there should be more and closer co-operation between the industry and the colleges and universities from which the future leaders of the industry will be recruited.

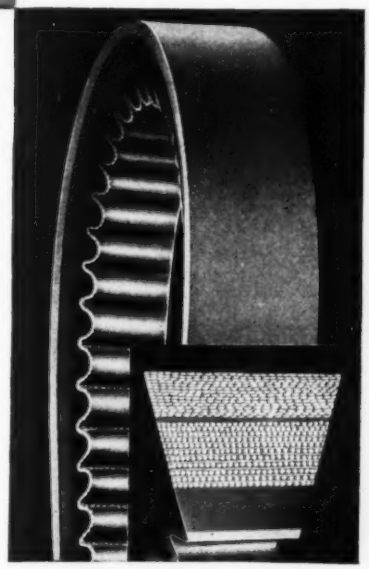
NO OTHER V-BELT COMPARES WITH DAYTON FOR LONG LIFE

Unrivaled stamina . . . defiant toughness . . . outlasting ruggedness . . . these are the qualities which give the Dayton Cog-Belt its matchless endurance. No other V-Belt approaches it in vitality and persistent long life.

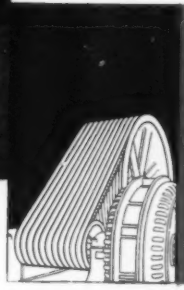
And the Dayton's patented, laminated construction saves it from the strains and stresses which shorten the lives of other belts. It bends easily without resistance and distortion. It rides straight and true in the pulley grooves . . . without squashing, twisting and whipping. It runs cool because its smooth-flowing action prevents the chafing and friction which create destructive internal heat.

From the very nature of its exclusive features and distinctive performance, the Dayton Cog-Belt gives phenomenally long service. That's why long life Dayton Cog-Belt Drives often cut belt replacements in half.

Equip with Daytons and forget your transmission troubles. Write us for catalogs and data, or call your local Dayton distributor.



THE DAYTON RUBBER MFG. CO.
DAYTON, OHIO



Dayton
COG-BELT DRIVES

MADE BY THE WORLD'S LARGEST [D] MANUFACTURERS OF V-BELTS

Random Thoughts

WILLIAM SIBLEY

◆ FIRST OFF I want to doff my hat to Mr. Harris, President of General Alloys Company, Boston. He recently wrote a trade journal advertisement which is deserving of far greater circulation than is possible through trade journals. It is a masterpiece of design, photographic modeling, and thought. A velox print of that full-page advertisement is framed and now hangs on the wall of my office. Let me tell you about it. The advertisement is titled:

RECIPOCRATEES
(Resi-poc-ra-teze)
THE BACHELOR FATHER
of "Reciprocity"

And the brief copy continues thus:

"Wreathed in poison ivy sits the Perverse Progenitor of a Thousand Evils. He would prostitute the Purchasing Agent, degrade the Salesman, ignore the Engineer. He swaps the equities of Stockholders without their Knowledge or Consent. The Doctrine of Reciprocity was plagiarized from the Chinese, originators of the twin backscratchers. Carried to its ultimate conclusion we would be taking in each other's washing. American Industry was built by Science, Initiative, Merit and Competition—still a good formula. Eject the rotten apples from the basket —before our business ethics fall to the level of politics. Signed: H. W. Harris
President, General Alloys
Company, Boston.

"General Alloys have grown to the oldest and largest exclusive manufacturers of heat and corrosion resistant alloy castings without reciprocity. We solicit your business on a basis of unequaled experience."

For some readers of this page perhaps the basic thought contained in this advertisement is one that pinches. Not all members of the paper industry are free from the malicious practice of business reciprocity. But every member should be. I have never met Mr. Harris, but I hazard the guess that he would be glad to send you a copy of his advertisement if you wrote him.

◆ SOME DAY this nation is going to honor the name and pay homage to the discovery of a serious minded and altogether gentlemanly Mr. Quilligan. With all due respect to Pasteur and the marvelous benefits which have accrued to the human race through what we now call pasteurization, in my opinion (which is confirmed by many others) Mr. Quilligan has done more for milk, and thereby the human race, than Pasteur. By a comparatively simple and inexpensive process of filtration Mr. Quilligan makes milk both cleaner and far more digestible.

You see, cow's milk was made for a calf's stomach. Obviously, you say. Yes, but what many of us don't know is the fact that with cattle about 80 per cent of the processes of digestion are done in the stomach. That's why cows have two stomachs—and why the cow takes time out to lie down and regurgitate and remasticate her food. And that being true, when the Supreme Architect made milk for the calf he made a kind of milk that would almost instantly coagulate and curd in the stomach. . . . So the calf's stomach would have a semi-solid mass of curdled milk to work with. So far, so good. But—things are just reversed in human beings. Only about 20 per cent of the process of digestion takes place in our stomachs; about 80 per cent of the digestion being done in the intestinal tracts. And yet we put milk in our stomachs which instantly forms into a curd—and in a stomach which is not prepared by nature to take care of that form of solid.

Doctors and pediatricians have known this for years, and for years have sought ways whereby the milk curd might be softened. Much has been accomplished along those lines, too; more especially by heat treating and homogenization. The which gives us evaporated or condensed milk. Real improvements for digestibility these are, the tension of evaporated milk curd being about 8 degrees as against a tension of 22 for ordinary milk's curd. (Mother's milk, of course, has a tension of zero.)

Unfortunately for evaporated milks, the processes by which they are made change the flavor and texture of the cow's milk. And that prevents their universal acceptance and use, save as baby food or cooking. Now Mr. Quilligan has found a way whereby ordinary cow's milk may easily be processed and left absolutely unchanged in either texture or flavor and with a zero tension for curd, exactly like mother's milk. More than that, indeed, Mr. Quilligan's milk is, by laboratory test, 75 per cent more germ free than pasteurized milk! A milk that is absolutely clean and one which remains liquid throughout the processes of digestion. All honor to Mr. Quilligan and his "sofkurd" milk.

◆ SPEAKING OF MILK—there is an industry which deals in figures which would stagger even the New Deal's financial wizards. Today's cows produce nearly fifty billion quarts of milk a year, about fifteen billion of which remains on the farm for the farm people and farm stock. About thirty-five billion quarts of this is sold to creameries, cheese factories, etc. About fifteen billion quarts is sold to the public in liquid form, the other twenty billions going into the production of not only cheeses, butter, etc., but buttons, poker chips, knives, cigarette cases, fountain pens, paper sizing, synthetic cork, and a lot of other products the soft-eyed cow would regard with bewilderment.

ADVERTISING PAGES REMOVED

THE PAPER INDUSTRY

Stores as a Control for Management and Operator

K. F. SPEELMAN, General Storekeeper
Minnesota and Ontario Paper Co.

WHAT is your stores organization worth to you? How much of your money does the Stores Department spend for you annually? What is its proportion of your annual cash outlay? How much money have you invested in your average operating period inventory balance? How accurate is this balance? Of this balance, how much is invested in miscellaneous stock, spare parts, materials utilized in manufacturing conversion, idle equipment, etc.? How many times per year do you turn your various classifications of stock? Is your stores record actually self-perpetuating? Are your charges controlled and accurate as to department utilization when the materials are disbursed from stores? Can your stores be a real Central Organization?

These are some of the questions which confronted the management of the organization where the author is storekeeper. The methods which have been used in that study, and the controls which evolved may be of interest to others in the industry.

Perhaps the most fortunate feature of the study in question from the outset was that only the results to be accomplished were considered, the means to the accomplishment being built as progress was made.

The first consideration was an exhaustive study of stocks. Each department head made a study of special items stored for his use, filling in a stock card provided which gives a complete description of the article, its use, disbursing unit and the normal quantity of stock required by him. Following this, the Master Mechanic and his various assistants made an identical survey of materials remaining unidentified. Upon the completion of these surveys, all unidentified or obsolete materials were removed and scrapped.

A general rearrangement of all stock was made. This rearranging was done on the basis of classification and ease of servicing. All materials of like nature, or for specific operations, were stored in adjacent localities as far as possible. All bins or areas for the storage of bulk commodities were surveyed and their capacities at all stages calculated. Upon completion of rearrangement, each item of stock was given a stock number, care being exercised that each number covered but one item of stock. The system of stock numbers is so arranged that each number clearly indicates the exact position of each item in the stores. In so far as is practical, all materials of operation or repair are under storeroom supervision.

M.O. 25 13018-BP-36

Minnesota & Ontario Paper Company
MATERIAL REQUISITION

USED FOR ..... CHARGE TO .....

USE THIS SPACE FOR ORDERS		THIS SPACE FOR STORES DEPT.				
Quantity	Description	Stock No.	Unit Price	Quantity	Unit	Value

Foreman ..... Date 1937

Order No. | Clerk | Posted

S. D. 8102-BP-34

MAT'L .....

FOR .....

STOCK NUMBER	DISB. UNIT	MIN. CONTROL	MAX. CONTROL

DATE	RECEIVED		DISBURSEMENTS		ON HAND
	REC.—QUAN. ORDER NO. M. R. R.	QUANTITY	REQ. NUMBER	QUANTITY	

M & O 46 1037-BP-37

Purchase Requisition

PURCHASING AGENT: THE FOLLOWING ARTICLES ARE REQUIRED BY

COMPANY _____ REQUISITION NO. _____

SHIP TO _____ CHARGE TO _____

DATE _____ PURPOSE _____

STOCK NUMBER	ON HAND	QUANTITY REQUIRED	DESCRIPTION

REQUIRED BY _____ CHECKED BY _____ APPROVED BY _____

Materials are disbursed only upon the receipt of properly executed requisitions in duplicate. Such a requisition must be dated; it must show what the material is used for, which department shall bear the charge, and correctly describe it. It must bear the signature of the department supervisor requesting the withdrawal and be countersigned by the person presenting the requisition. Periodically, all supervisors are requested to furnish the Storekeeper with the names of those in his personnel who may countersign requisitions, and a list of these names is posted in the stores for the information of the stockman. Access to the stock can be made only through admission by members of the stores personnel.

The stockman upon receipt of a *Material Requisition* numbers it and records its number, as well as noting on the requisition his clerk number. As the materials requested by the requisition are disbursed, entries are made on each material's stock card of the requisition number, the amount of material withdrawn, and the

M 123 11093-BP-36 VOUCHER DEPARTMENT

Minnesota & Ontario Paper Co.

MATERIAL RECEIVED REPORT

Date..... 193..... M. R. No. _____

SHIPPER _____

ADDRESS _____

Req. Number	Order No.	No. Pkg.	Carrier	Car Number	Pro. Number	Date	Freight	Express	Truck

Quantity	DESCRIPTION	Stock Number	Invoice Cost	Transportation Cost	Total Cost

DISTRIBUTION _____ RECEIVED BY _____

REMARKS _____

_____

_____

Storekeeper

MATERIAL									CONTROL	AISLE	SECT.	SHELF
ORDER NO.												
ORDER QUANT.												
M. R. NO.												
M. R. QUANTITY												
VOUCHER NO.												

RECEIVED				DELIVERED				ON HAND		
DATE	VOUCHER	QUALITY	AMOUNT	DATE	STORES REQUISITION	QUANTITY	COST	QUANTITY	UNIT PRICE	COST

quantity of stock remaining on hand. At the close of each day's business, all material requisitions, with their number record are transmitted to the Stores Accountant who checks requisitions against records to assure their receipt.

Stock inventories are maintained through minimum controls shown on the stock cards as well as the stores accounting stock records. When stocks reach, or approach, this established control, the disbursing stockman makes the necessary memorandum or removes the *Stock Card* from the stock until it is made. Also, the Stores Accountant in posting material requisitions to his record, lists for the Storekeeper's attention those items of stock which his control indicates need replacing.

STORES RECORD

SHEET NO._____

DESCRIPTION_____ STOCK NO._____

UNIT_____

REFERENCE		RECEIVED		DISBURSED		BALANCE		UNIT
DATE	NUMBER	QUANTITY	VALUE	QUANTITY	VALUE	QUANTITY	VALUE	PRICE
FORWARD								

Where it is possible, stock cards may indicate the normal re-order quantity, though this feature may prove impractical due to constantly changing repair and operating conditions. As the replacement memorandum is made, it is so noted on the stock card to avoid duplication, dated, and initialed by the maker.

Purchase Requisitions are compiled for transmission to the Purchasing Agent. A separate one is made for each classification of stores stock such as Miscellaneous Stores, Spare Parts, Conversion Material, etc. The stock number, quantity on hand, amount required, and specification of each material are shown, as well as brand or such manufacturer's preference as the production department may request.

New materials are carefully examined upon receipt, and such listings made as are necessary for the compiling of the *Material Received Report*. No order copy or reference to instruction to supplier is used during receiving, since it has been found to create a large number of errors. After receiving, the Material Received Report is made up in conjunction with a copy of Purchase Order. This report must contain all the information required by any of the various departments which use it, showing: quantity and description of each item; name and address of supplier; purchase requisition and order number references; type of transportation utilized; charges and billing references; number of packages in shipment, etc. It must also be dated and numbered and show distribution of charges and remarks, and be signed by the maker.

Originals of the Material Received Report are transmitted to the Treasurer's Department for comparison with vendor's invoices as to quantity and description, after invoices have been approved by the Purchasing Department for payment. Such copies as are required by Stores Accountant and Storekeeper are given to the Storekeeper. One copy is retained in the receiving file.

The Storekeeper upon receiving Material Received Report stock numbers each item of the report, making a new Stock Card for it. As the new materials are stored, the existing stock is inventoried; its Stock Card removed, noted, dated and initialed by stockman. Existing inventory quantities are transferred to the new Stock Card, and this card's record completed for use. When the storing of all the materials shown on the receiving report is finished, this report and the old stock cards are returned to the Storekeeper who directs to the Stores Accountant his copy, as well as assisting in the checking of the old stock cards with the accounting stock records for agreement. The Storekeeper retains his copy of the receiving report for such of his references as may be required.

On receipt of copy of paying voucher and its invoices

from the Treasurer's Department, the Stores Accountant prices the Material Received Report and from this report posts his controls. The type and method of stores accounting control is dependent on the size and turnover of stocks, and the requirements of the Comptroller and Storekeeper. For stocks of normal size and average turnover, control by alphabetically arranged, stock number referenced, *Hand Posted, Visible Card* equipment is adequate. However, for large stocks with heavy and rapid turnover, control by stock number arranged, material description referenced, *Machine Posted, Ledger Cards* has proved more satisfactory, though it must be augmented by an alphabetical, stock numbered reference catalogue.

This system is flexible, accurate, and self-perpetuating. It shows at all times the investment in each type of stock and its turnover. Analytical data is readily obtained and is satisfactorily answering requirements.

Paper Machine Production Slide Rule

D. S. DAVIS
Dale S. Davis' Associates

NEARLY every type of technical control work necessitates a computation of one sort or another, confronting the engineer with the problem of providing adequate means of calculation. This entails a choice between tables, graphs, the standard slide rule, alignment charts, and special slide rules. The two former methods are usually too cumbersome and not sufficiently flexible, while the standard slide rule requires the use of a formula and a subsequent pointing-off in the result. For most purposes, specially constructed nomographic or alignment charts are to be preferred by virtue of their ease of reproducibility and low cost, yet, for the sake of compactness, a special slide rule is often advantageous.

A case in point is the calculation of hourly paper-machine production from ream weight, speed, and width according to the formula

$$P = \frac{5}{A} B\, w\, v$$

where P = production in pounds of paper per hour
A = a constant dependent upon the definition of the ream
B = ream weight, in pounds
w = width of sheet, inches
and v = machine speed, in feet per minute.

A is really the area, in square feet, of paper in a ream and is given by

$$A = \frac{a\, b\, N}{144}$$

where a and b = ream dimensions, in inches
and N = number of sheets in the ream.

In the case of a ream designated as 25 inches x 38 inches, 500 A = 25 (38) 500/144 = 3299 and the production equation becomes

$$P = 0.001515\, B\, w\, v$$

Production nomographs and detailed methods covering their construction have been presented elsewhere (*1, 2*). It is the purpose of this paper to describe the design of a special slide rule to handle the above formula advantageously.

Multiplication and division are preformed logarithmically by the addition and substraction of logarithms, and slide rules are merely mechanisms for adding and subtracting the logarithms of the numbers which appear on the scales. In logarithmic form the above equation is

$$\log P = \log 0.001515 + \log B + \log w + \log v$$

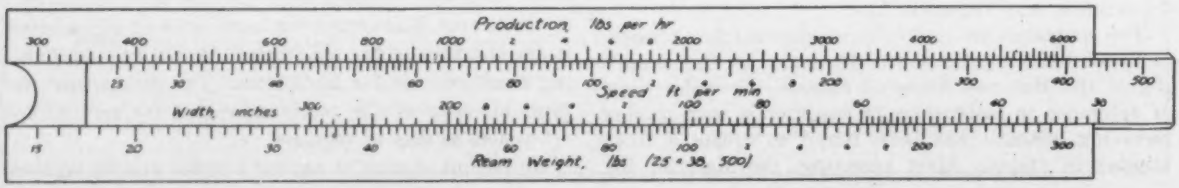
and we have only to arrange logarithmic scales on a slide rule blank so that this relationship is satisfied.

Brief experiments with a crude paper model slide rule show that three of the four scales must increase in the same direction, which should be chosen from left to right, while the fourth scale will correspond to a CI scale on the standard rule.

Suitable ranges of data are

B, 15 to 300 lbs.
w, 30 to 300 inches
and v, 25 to 500 feet per minute,

and a good modulus (length of scale represented by one unit in plotted function) is 25 cm. The scale lengths then become $25 \log \frac{300}{15} = 32.53$ cm.; $25 \log \frac{300}{30} = 25$ cm.; and $25 \log \frac{500}{25} = 32.53$ cm., respectively, for the B, w, and v-scales. A satisfactory range for P is 300



to 6000 pounds per hour and the length of the P-scale is $25 \log \frac{6000}{300} = 32.53$ cm., from which it is seen that a 34.5-cm. slide rule blank is sufficiently long. The four scales are laid out on heavy white paper (photographic paper is excellent) and are mounted on the blank by means of a good glue. The P, B, and v-scales can be centered as shown in the accompanying figure while the w-scale must be placed in such a position that the production equation is satisfied.

The use of the production slide rule is illustrated as follows: What is the hourly production of 50-lb. paper (25 in. x 38 in., 500) when the width is 200 inches and the machine speed is 120 feet per minute? Set 200 on the w-scale over 50 on the B-scale and over 120 on the v-scale read the desired value as 1820 pounds per hour. What production would have been attained had the ream weight been on the basis of 24 in. x 36 in., 480? Set 100 on the speed scale under 1820 pounds per hour on the P-scale and read the new production value as 2080 pounds per hour over the arrow which appears on the v-scale at 114.5. Other arrows can be added to take care of other ream definitions. Such arrows are placed at values of v equal to 329,900/A, where A is the area of the paper in the ream.

In the same manner, the slide rule can be used to determine any one of the variables when the others are given. Thus, how fast should a machine be run to produce 2400 pounds of paper per hour when the width of the sheet is 180 inches and the ream weight is 60 pounds (25 in. x 38 in., 500)? Set 180 on the w-scale over 60 on the B-scale and under 2400 on the P-scale read the machine speed as 147 feet per minute. In addition, the P and v-scales may be used together to perform ordinary multiplication and division operations just as the C and D scales are used on the standard slide rule.

BIBLIOGRAPHY

1—*Paper Trade J.*, 94, No. 2, 13 (1932)
2—*Paper Industry*, 13, No. 9, 1101 (1931)

Those who desire a neater and more precise rule will be interested in learning that one of the well-known manufacturers of slide rules is prepared to make up this special rule, on order, at a reasonable price.—*Author's Note.*

Summary of Research on Preservation of Records

THE results of further studies made as a part of its effort to obtain comprehensive information on the preservation of records, are summarized by the National Bureau of Standards in a revised edition of its general summary report of this research, prepared by A. E. Kimberly and B. W. Scribner.

Because of the rapidly growing use of motion picture films as a means of reproducing record material, either as a preservative measure or for more general accessibility, the research was extended to a study of the stability and optimum storage conditions of films. Both the acetate and the nitrate films were studied. The former was found to be a stable material but information on the resistance of the emulsion to wear and other influences is incomplete. The nitrate film showed a comparatively short life, but information was developed on the most suitable conditions for maximum longevity in storage and use of both this and the acetate type. The study was made possible by the financial support of the Carnegie Foundation and the National Archives. The latter also supported an investigation to determine whether certain fumigants could be used to rid documentary material of insect life without injuring the material, because all incoming material is treated in fumigating chambers before it goes to the storage stacks. All of the fumigants studied were found to be harmless to paper.

Some revision has also been made in the summaries of the previous studies. These studies were initiated by a survey of the relation of conditions of storage in libraries to the condition of stored documentary material. The results indicate that light, temperature and the humidity and purity of the air, are conditions which need careful control to minimize deterioration of stored material. Air acidified by sulphur dioxide from the combustion of fuels was found to be deteriorative to material stored in libraries of congested areas, but it was proved by investigation in the Folger Shakespeare Library that library air can be completely cleansed of this deteriorative gas. As a result of these studies, it is recommended that good library practice should include the use of diffused illumination, and as little of it as possible, and the use of an air conditioning system for the maintenance of moderate temperature and humidity and the removal of acidic gases from the air.

Tests of hundreds of modern papers, and papers from old books and newspapers, showed the necessity of careful choice of paper for permanent record use, and that the choice should be based on the purity of the fiber, rather than its source, and on the purity of the paper in other respects. Protective coatings for papers were also given attention, and both transparent cellulose sheeting and Japanese tissue papers were found suitable.

Writing ink was known to be more or less deteriorative to paper. More exact information on this was obtained, which showed that the ordinary type of ink is distinctly deteriorative to all types of record papers. But the results of study of a special type of ink proposed by other investigators indicated that it might be used without harmful effect.

The world-wide interest in the findings of this series of studies is a good omen that posterity will not be cheated of its rightful heritage of the accumulated recorded knowledge of preceding generations. There are many evidences that improved library practices have resulted from them.

An Old Italian Paper Mill

◆ ◆ ◆

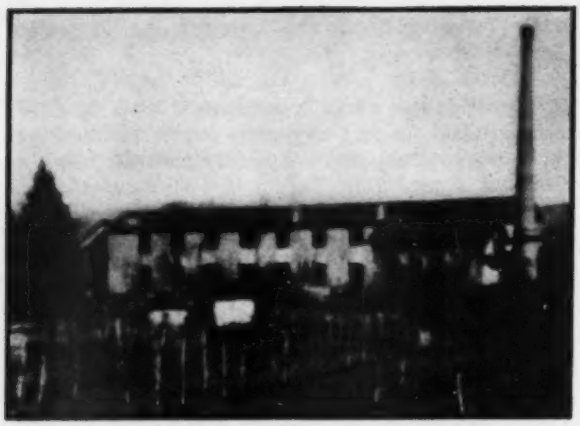


Figure 1

RAFFAELE SANSONE

THERE are places, even in the most civilized countries, where progress penetrates with difficulty, or does not penetrate at all, and where everything remains the same as it was many years ago. Progress has scarcely affected certain mountain districts, and the valleys between mountains sometimes show no sign of the developments made during recent years. On a few wide plains, agriculture, still in an almost primitive stage of evolution, is the sole source of livelihood. The casual traveler, accustomed to the social aspects of life as encountered in up-to-date industrial centers, can still find, even in progressive Italy, ways of producing paper and paperboard not far removed from the "cradle methods" utilized when these two important products were introduced during the twelfth century in Europe, as substitutes for papyrus and parchment.

To understand the reasons for such retardation of progress, one must consider the tremendous changes and transformations undergone by industries the world over during the latter half of the last century. Up to 1870, there were very many small mills, the existence of which was rendered possible through the custom of absorbing locally the various products which were manufactured. Through this arrangement many small and isolated producing and absorbing centers were formed, sometimes made up only of small villages or towns, where self-support was aided by the cultivation of grain, Indian corn and hemp.

These conditions existed primarily because of the established custom of handing the business down from father to son and because of the general sticking-together policy of all the inhabitants of the small area. Such conditions permitted stability and security to the small paper producer whose raw materials were easily secured and who always had a market for the goods he produced. Thus, old-fashioned methods were continued generation after generation with regular uniformity simply because there was no need of changing them.

There were, of course, instances of small mills produc-

Figure 2

Figure 3

Figure 4

ing superior qualities of paper and paperboard, or other specialties, which retained for them a fame which lasts even to the present day. (The Fabriano Paper Mills is one of these.) Such mills, however, had to work on a somewhat different principle than the ones previously described and had to search often for markets throughout an extended area; an activity which involved the use of modern business methods. Most of these mills have kept up with the trend of the times and at present their output is quite considerable.

The raw materials used in the small, old-type, mill varied according to local conditions. Mills located near large towns or seaports used rags as their base stock, while wood or other fiber-producing plants were used by mills located in isolated villages. When forests were close at hand, the papermaker used twigs, brambles and other small wood. In cases where he could not procure quick lime to produce cooking liquor for pulping, he extracted the ashes of the wood he had burnt to obtain impure carbonate of potash. A very weak solution of this alkali was used to treat the twigs or other fiber-producing materials tha had just been cut. Needless to say, the paper supplied to the consumers was not of the finest quality but it suited the purpose and defects were generally overlooked.

The progress of industry, however, was soon to have its deleterious effect on the small paper producer. The extensions of railway lines and the increased use of motor cars created rapid and easy contact between most of the out-of-the-way regions and the most developed parts of Italy. Hence the number of small paper mills was considerably reduced until now such mills are located only in places where access is well-nigh impossible save by mules or donkeys. In some places, raw materials are transported only by human beings, roads and trails being unfit for even the wary-footed burro. Such crude methods of transportation are to be found in villages of the Alps and Appenines where some of the old paper mills have been in operation for generations.

Figure 1 shows an old paper mill which, although small, can still be worked profitably. The building is constructed of very large stones and has several windows, none of which have glass panes or shutters. The first part of the building is used for wood-breaking and fiber-producing; operations which are still carried on by hand in a rudimentary manner. Here, also, is the rather old equipment for producing handmade paper or paperboard. The mill's products are stored away in a building at the back which serves, incidentally, as habitation for the mill-master and his family. On one side of the mill is a long two-story peasants' house where the millhands live, together with their wives and children.

The ground surrounding the mill belongs to the papermaker. Here grain and other crops are grown to assist in the maintenance of the tiny population which the papermaker governs as master. The mill owns no horses, mules or donkeys.

Wood is brought to the mill by peasant women who arise at dawn and make their way over a rough path, several miles into the forest, where they gather the branches that have been cut by the men who preceded them. Some of the women carry such bundles on their heads (Figure 2) but others, not having the necessary resistance to head fatigue, prefer to use large wooden shoulder baskets (Figure 3) for the transportation of wood. The shoulder baskets resist wear and allow for a more equal distribution of the load which renders the burden less heavy. These women have accustomed themselves to such labor since early childhood and show no signs of fatigue after their work is over. They are quite cheerful and seem wholly satisfied with their lot. Many of them become mothers rather early in life and raise sizable families and all of them live simply, without the slightest semblance of pretentiousness.

As soon as the women bring the wood to the mill some of it is set aside to dry while another portion, that is to receive treatment for the production of paper, is piled neatly in back of the mill as shown in Figure 4. Here it is covered with corrugated iron plates in order to protect it from the sun and rain. The supply of wood is not allowed to become too great, however, as the paper producer prefers to keep his help continually occupied with a carefully balanced working schedule.

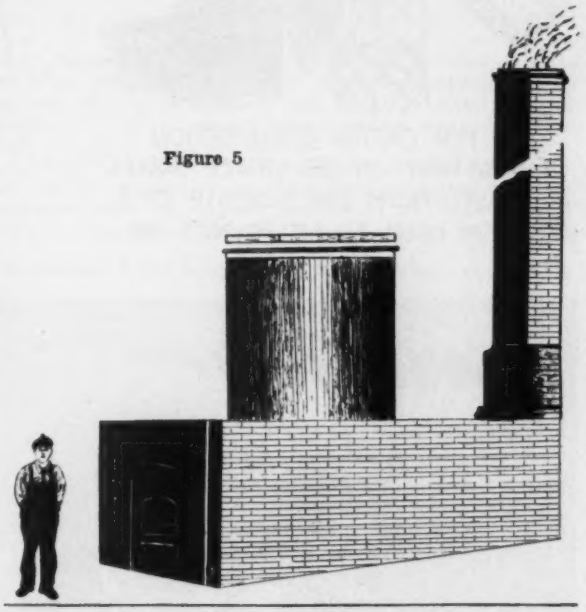


Figure 5

A large, vertically arranged, cylindrical iron tank is used for digesting the fibrous raw material. The tank, set in the top of a long, rectangular, red brick furnace, fired with wood, has a rounded bottom and is covered at the top with a lid of heavy wood (Figure 5).

Both the raw material and the cooking liquor (a milk-of-lime liquor being commonly used) must be charged into the tank by hand. The raw material is delivered to the tank through the use of a shoulder carrier or similar apparatus while wooden buckets serve for the handling of lime and water. All of these materials must be carried up a ladder to get them to the top of the tank for charging and all of the water must be hand-pumped.

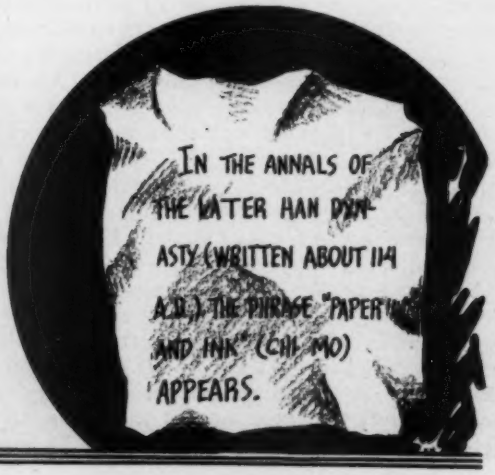
Such operating conditions, antiquated as they are, have not stopped several generations of papermakers from making a livelihood for themselves and families from this small mill. Some of their children have left home from time to time to study in larger communities, but new ideas and modern trends seem to have left the home community totally unaffected.

Paper Sketches---

THE PER CAPITA CONSUMPTION OF NEWSPRINT IN THE UNITED STATES INCREASED FROM ONE-SEVENTH OF A POUND IN 1810 TO 62 POUNDS IN 1929.

WHILE VISITING HENDRICK ONDERDONK OF LONG ISLAND ON APRIL 24, 1790, GEORGE WASHINGTON, THEN PRESIDENT OF THE UNITED STATES, DIPPED AND COUCHED A SHEET OF PAPER AT THE MILL OWNED BY HIS HOST. THIS SHEET OF PAPER IS SAID TO HAVE BEEN LONG PRESERVED AT THE MILL.

A HUNDRED THOUSAND REAMS OF PAPER WERE SOLD IN A SINGLE DAY DURING 1726 AT AMSTERDAM, HOLLAND.



Champion's Sulphate Pulp Mill in Texas

HARRY E. WESTON

A LITTLE over a century ago, Sam Houston, Stephen F. Austin, David G. Burnet and about 30,000 other Anglo-American colonists in Texas were dreaming of the empire-making possibilities of the region. They fought Mexico for their independence, a small Texan army under General Sam Houston winning a decisive victory over Mexican troops under General Santa Anna on April 21, 1836, at San Jacinto, only about fifteen miles southeast of the present City of Houston.

Santa Anna, fleeing from the battle, was discovered and taken prisoner the following day by a searching party under Sergeant James A. Sylvester. His capture led to the treaty between himself, as President of Mexico, and the Texan Congress which was concluded on May 14, 1836.

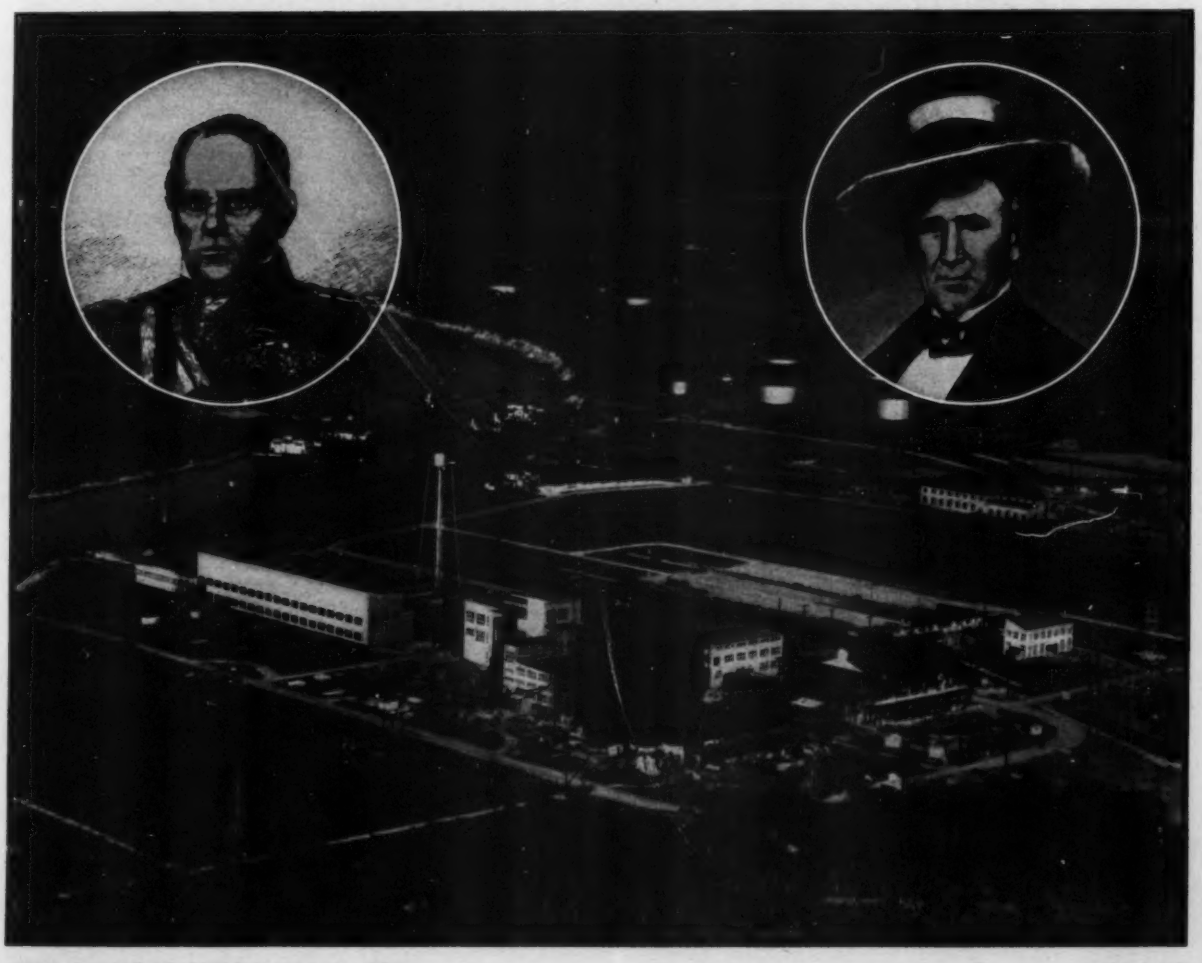
This brief bit of Texan history is related because of the new mill of The Champion Paper and Fibre Company at Pasadena, Texas. The site of the mill, an area of 162 acres, is on land designated as the old Santa Anna farm, it being the place where Santa Anna was captured following his flight from San Jacinto. The location is about twelve miles east of Houston on the Houston Ship Canal and adjacent to the Deepwater Plant of the Houston Lighting and Power Company.

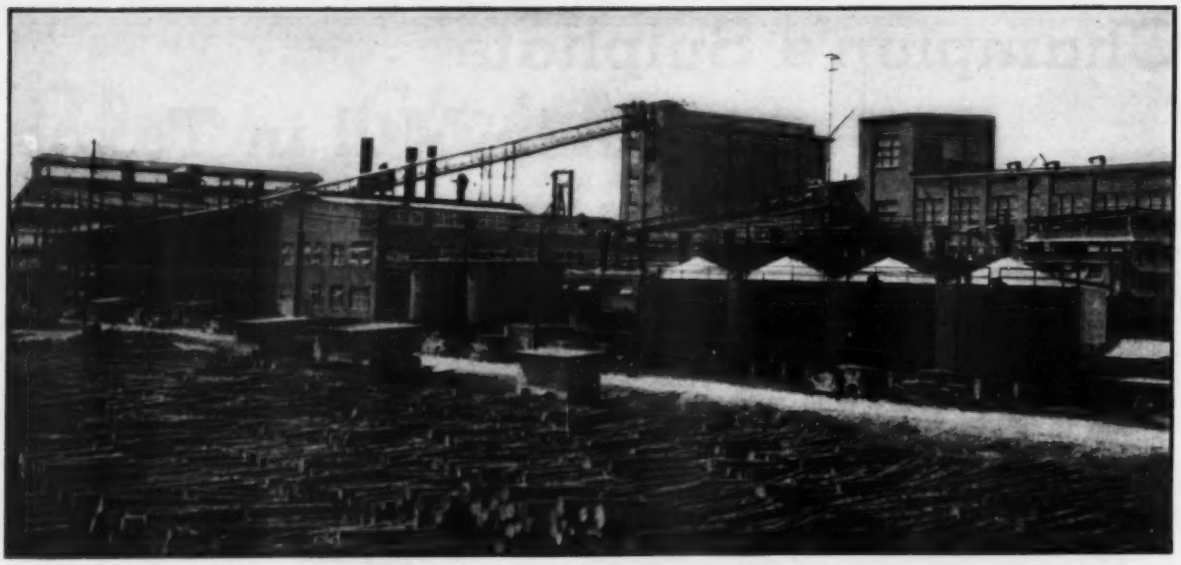
In addition to this mill, the company operates two other plants: one at Hamilton, Ohio; the other at Canton, N. C. The plant at Hamilton is an outgrowth of a coating mill that was established there during the eighties by Peter G. Thomson, who in 1893 expanded his operations and organized The Champion Coated Paper Company and in 1907 established the plant at Canton under the corporate name of The Champion Fibre Company. The Champion Coated Paper Company and The Champion Fibre Company operated until recently each under its own name, but now the three plants are known as the Hamilton, Canton and Houston divisions, respectively, of The Champion Paper and Fibre Company.

The plant at Hamilton, specializing in the manufacture of enameled and coated book papers, also produces a wide variety of uncoated papers. The plant at Canton, originally built for the primary purpose of furnishing the Hamilton plant with pulp, now produces pulp by the sulphite, soda, sulphate and groundwood processes, and also manufactures paper and paperboard, chestnut tannin extract, soda bleach, caustic soda, adhesive extract, sodium resinate and turpentine.

The integration of pulp and papermaking operations at Canton developed a need for another source of pulp for the Hamilton division, and it is to meet

General view of new Champion plant. Insets: (left) General Santa Anna; (right) Sam Houston





Chip conveyor bridge with wood yard in foreground

this need, at least in part, that the mill at Pasadena has been built. This mill his been designed for a daily productive capacity of 175 to 200 tons of bleached sulphate pine pulp, which, when added to the combined capacity of the other two plants, gives a total daily productive capacity for the complete operations of 250 tons of coated paper, 600 tons of uncoated paper, 620 tons of pulp, 120 tons of board, 110 tons of 25 per cent liquid chestnut tannin extract, 40 tons of caustic soda, 35 tons of adhesive extract, 10 tons of sodium resinate, and 600 gallons of refined turpentine.

The new mill, built at a cost of about $3,500,000, has been arranged to permit easy expansion of its operations either through the installation of equipment for increasing pulp capacity, or through the erection of an integrated paper mill, or both. Incorporated in its design are the findings of more than 15 years of development work in the plant at Canton.

Wood for the mill is to be obtained from the pine forests of east and south Texas. It may be delivered by truck, rail or barge. A stumpage contract on nearly one million acres of land in southeast Texas assures a long time supply.

Two Jeffrey wood conveyors, each with a total length of about 450 feet, a little over 300 feet of which is horizontal, deliver the wood from the wood yard to the barking drums. The operating speed of these conveyors is 100 f.p.m. and the individual capacity 20 cords per hour.

Wood may be fed to either of these conveyors direct from railroad cars or delivered to them from storage over Jeffrey portable units. There are two portable units for each main conveyor and each set is a duplicate of the other. One of the two in a set is approximately 50 feet long, while the other is nearly 70 feet in length. The shorter unit handles wood from storage piles inside two parallel railroad spurs. Wood also is piled on the outside of both of these spurs and it is to reach this wood that the longer units are used—one over each track and each designed with a 15-foot boom at the discharge end to permit elevation when railroad cars are to be passed.

The barking drums, two of them, are D. J. Murray-Branch type units. Each drum has a diameter of 12 feet and a length of 50 feet, and is driven through a belt drive by a 150-h.p. motor.

Three additional Jeffrey conveyors handle the wood that is discharged from the barking drums. The first of them is an inspection conveyor from which the unsatisfactorily barked wood is removed. The second unit, a return wood conveyor, receives the wood and returns it to one of the barking drums for another passage through it. The third unit receives the selected wood and conveys it to one of two chippers.

Another system of Jeffrey conveyors delivers the bark from the barking drums to a Hofft bark furnace, which is attached to an 870-h.p. Vogt four-drum water tube boiler. The system includes a double strand drag scraper conveyor to remove the bark from the drums, three intermediate 24-inch rubber belt conveyors that connect this unit with a storage bin and three single strand drag type units that convey the bark from the bin to the furnace.

The boiler unit is capable of producing from 30,000 to 70,000 pounds of steam per hour. The drums are designed for a working pressure of 400 pounds per square inch and are of fusion welded construction. The furnace is equipped with water walls.

The chippers, like the barking drums, are of D. J. Murray design. Both are 96-inch units. Each unit is directly connected to a synchronous motor which is completely enclosed and forced ventilated. Ready access to the motor from either side is made possible through the design of the base. The shape of the spout on each chipper is designated as octo-round.

Three Orville-Simpson Rotex chip screens and two rechippers make up the rest of the process equipment of the wood room. Each of the chip screens is driven by a 5-h.p. motor through a V-belt drive; while a 20-h.p. motor and a V-belt drive is used for each of the rechippers.

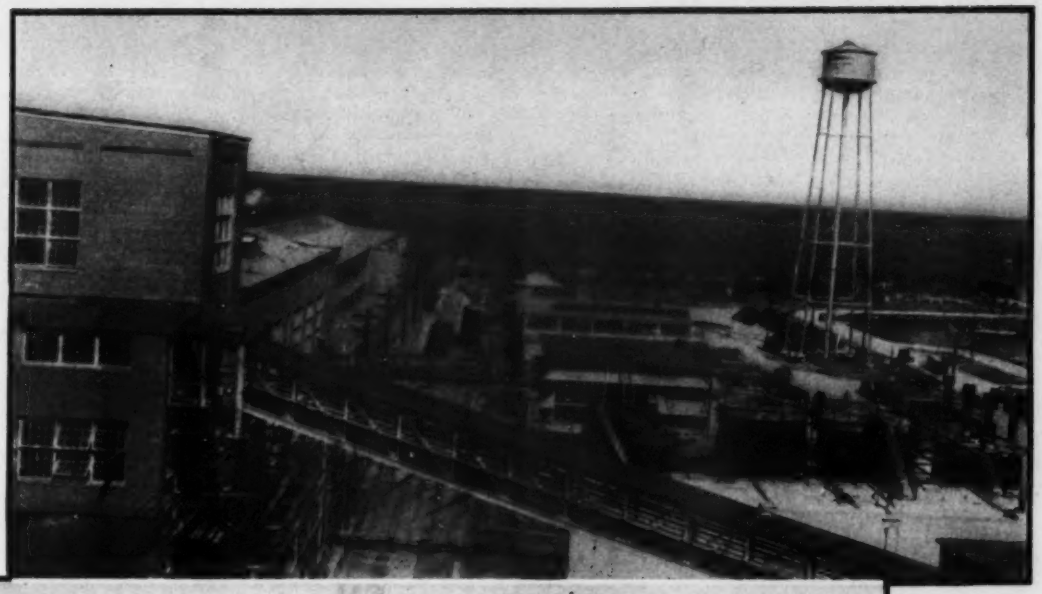
Other Jeffrey conveyors connect the chipper installation with the remaining process equipment of the wood room and convey the selected chips to the chip loft. Among these conveyors is a double strand drag-type unit that receives the chips from the chippers and distributes them to the screens, and a 36-inch rubber belt conveyor for carrying the chips from the wood room to storage. This latter conveyor is approximately 700 feet long and has a rise of 110 feet.

A short transfer conveyor, also equipped with a 36-inch rubber belt, receives the chips from the main chip conveyor belt and places them in storage.

The digester installation is made up of six Hedges-Walsh-Weidner Company digesters. An F. M. P. heater and pump is connected to each one of them. Likewise, blow steam from the digesters is condensed in one of two C. H. Wheeler, Type W, vertical, blow-down condensers.

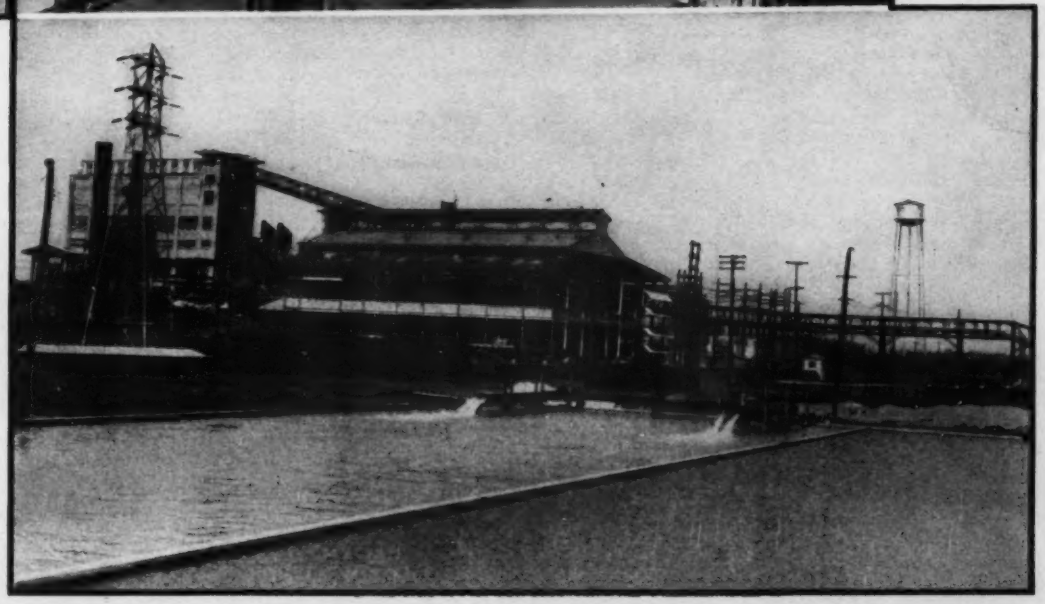
Each of the blow-down condensers is designed to prevent the incoming blow steam from impinging directly upon the condenser tubes and to permit the entire removal of the tube bundle as a unit from the shell. Likewise, the shell is provided with a series of hinged, quick-opening covers as well as a series of top wash down nozzles to permit washing of the surface between blows. In addition, there are high pressure water nozzles in the lower section of the shell for freeing the unit of any accumulation of pulp on the lower tube sheet. An opening at the top of the shell permits the release of non-condensable gases.

A two-stage system of vacuum washer pulp washing is used for removing the black liquor from the digester blown



View of main railroad sidings as seen from chip conveyor

Wood yard as seen from digester building



Clear water reservoir in foreground. Recovery and digester buildings in background

pulp. Oliver-Young vacuum washers are employed for the purpose.

The black liquor obtained from the Oliver-Young washers is delivered to either of the two triple effect vacuum evaporators for partial concentration. These evaporators, supplied by the U. S. Cast Iron Pipe and Foundry Company, are individually equipped with a C. H. Wheeler horizontal surface condenser.

Production of green liquor from this vacuum-evaporator, concentrated black liquor is accomplished in one of three recovery systems which contain individually a scrubber-evaporator, a Combustion Engineering waste heat boiler, a rotary with smelt pot, and a dissolving tank.

Causticizing of the green liquor is consummated in a Dorr continuous system. This system includes a two-compartment green liquor clarifier, a three-compartment green liquor dregs washer, a Stearns Roger lime slaker, a classifier, three causticizers, and two two-compartment white liquor clarifying thickeners.

The green liquor clarifier is 30 feet in diameter by 18 feet deep. It receives the green liquor from the dissolving tanks and settles the dregs from it. The settled dregs are pumped to the washer, a unit 26 feet in diameter by 22 feet deep, where they are washed free of any green liquor. Weak wash liquor thus produced is utilized in the cycle of recovery operations, the washed dregs being pumped to waste.

Metered quantities of fresh lime and of re-burned lime are fed into the slaker. The fresh lime is made at the mill from oyster shells, while the re-burned lime is made available through the recovery operations.

The slaked lime is freed of grit in the classifier and it is then ready for reaction with the clarified green liquor. Both the grit-free slaked lime suspension and the clarified green liquor are delivered to the causticizers for this purpose.

The causticizers—each a steel tank 9 feet by 6 feet and equipped with a 34-inch duplex Turbo-Mixer impeller—are set in series. Liquid by-passing is minimized by this arrangement. One of the two white liquor clarifying thickeners receives the slurry of liquor and lime carbonate from the causticizers. This thickener, which is 26 feet in diameter by 16 feet deep, overflows strong white liquor and underflows lime mud.

The lime mud is withdrawn from the thickener's underflow cone by a diaphragm pump which delivers it to the second thickener. The second thickener, of the same size as the first and functioning in the same manner, overflows weak white liquor and underflows partially washed lime mud.

This mud, after further washing and concentration on two series—arranged Oliver lime mud filters, is reburned in a Traylor rotary lime kiln. The diameter of the kiln is 8 feet; the length, 125 feet.

The pulp washed on the Oliver-Young pulp washers, receives its preliminary screening in an installation of Impco knotters, its final screening over a system of Impco flat screens, and is thickened on Impco vacuum thickeners or on two wet machines. A rod mill is provided to refine the rejects from both the knotters and the flat screens.

An electrolytic bleach plant, as an integrated part of the mill, furnishes chlorine for pulp bleaching. It also supplies caustic soda for use in liquor making as well as elsewhere in the operations.

This plant is assured of its salt supply by the ownership of nearly 50 acres of nearby salt deposits, thousands of feet in depth, from which the salt may be delivered by pipe line. Such a line has already been proposed.

Multi-stage bleaching is employed to bleach the brown stock. This method makes use of acid washing. Final washing of the bleached stock is accomplished on a rubber-covered Oliver-Young washer.

The bleached pulp, after final washing, is dried on a Black-Clawson fourdrinier.

Features of the fourdrinier part of this machine, which is made almost entirely of bronze and stainless steel, include a wire 80 feet long and 166 inches wide; seven bronze suction boxes; rubber-covered table and wire rolls; and a 30-inch diameter by 168-inch face Downingtown suction couch roll.

Vacuum requirements of both the flat boxes and the suction couch are met with Nash pumps, one for each application. The size of the pump on the flat boxes is L-6. An L-9 unit is used on the suction couch.

One Downingtown suction press and two plain presses make up the press section.

Both the first and second press felts are equipped individually with a Downingtown suction felt roll and each felt roll, in turn, with an L-6 Nash pump. The roll in each case is 16 inches in diameter and has a 168-inch face.

The dryer section, arranged in double deck, includes fifty-six 60-inch dryers and a 36-inch lead on dryer. These dryers are equipped with packing boxes of Shartle design and with Maag cut gears. In addition, there is a Sheahan carrier, a Bowser system for lubrication, a Nash dryer exhaust unit (No. 124) with Coe Drainators and a Ross removable panel construction hood.

Following the dryer section is a Black-Clawson heavy duty duplex cutter for the sheeting of the dried pulp. Design features of this cutter include heavy-duty cutter bars driven by V-belt drives; high speed steel knives; guard rolls ahead of draw rolls; separate drive for first set of draw rolls; tapes, driven by a variable speed drive, adjustable across the machine; telescopic guide boards; and directly connected vertical type speed changers to knives and drawroll shafts.

All frames on this machine, from the fourdrinier part to and including the duplex cutter, are of the box type of construction. All rolls are mounted in antifriction bearings.

Motive power for the machine is supplied through a direct current General Electric sectional drive that has been designed to operate over a speed range of 120 to 800 feet per minute.

Each section driving unit consists of a totally enclosed, externally ventilated, compound wound motor and a Falk parallel shaft, herringbone-type speed reducer with Falk flexible coupling. A 100-h.p. motor is used on the couch section; a 50-h.p. motor on each of the three presses; and three 100-h.p. motors on the dryer section.

Direct curent power for the several motors is supplied by a 4-unit motor generator set.

A splash-proof button station with self-contained ammeter, located on the front side of the machine, permits the starting, stopping, operating at slow speed or jogging of the individual section motors; while a Selsyn transmitter unit, also controlled from the front side of the machine, maintains the draw.

Speed of the machine as a whole may be controlled from a small wall-mounted auxiliary panel. This control is concentrated in two manually-operated rheostats, one for coarse speed, the other for fine.

Pulp sheets from the cutter are bundled in one of three Baldwin-Southwark pulp presses. These presses are of the oil operated type and have automatic control, two of them being 480-ton units, the third a 600-ton.

Two high pressure turbines, one a 4000 kw. unit, the other 5000 kw., operate on steam led through a pipe line from the adjoining plant of the Houston Lighting and Power Company, furnish power for the mill. Most of this power is distributed as 440 volts. A few of the larger motors require 2200 volts.

Westinghouse motors are used throughout the mill for all drive applications other than the chippers and the pulp drying machine. These motors, totaling approximately 250, range in size from one h.p. up to and including 300 h.p. Most of them are within the range of 10 h.p. and 75 h.p. Many are direct-connected. A relatively few drive through silent chain, chain, V-belt and flat belt, or are gear motors. The motor types, depending upon the individual application, include squirrel cage-totally enclosed fan cooled; squirrel cage-totally enclosed; squirrel cage-splashproof; squirrel cage-standard open; wound rotor-splashproof; wound rotor-totally enclosed fan cooled; and synchronous-splashproof. By far the largest number are the splashproof and the totally-enclosed, fan-cooled, squirrel-cage types.

A number of Ingersoll-Rand pumps are used throughout the mill for process purposes. Several different types are included. Some are rubber-lined.

The machine room is provided with a Ross heating and ventilating system.

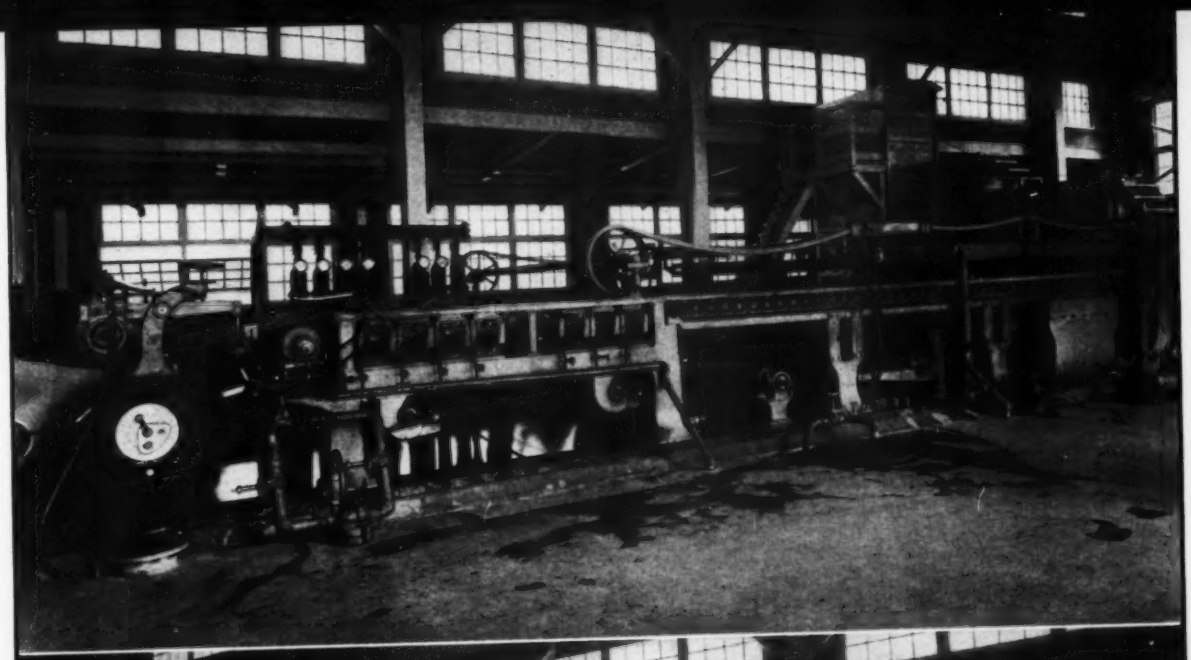
Deep wells furnish the water supply for the mill. These wells, driven by the Layne-Texas Company, have a capacity of 15,000,000 to 20,000,000 gallons a day.

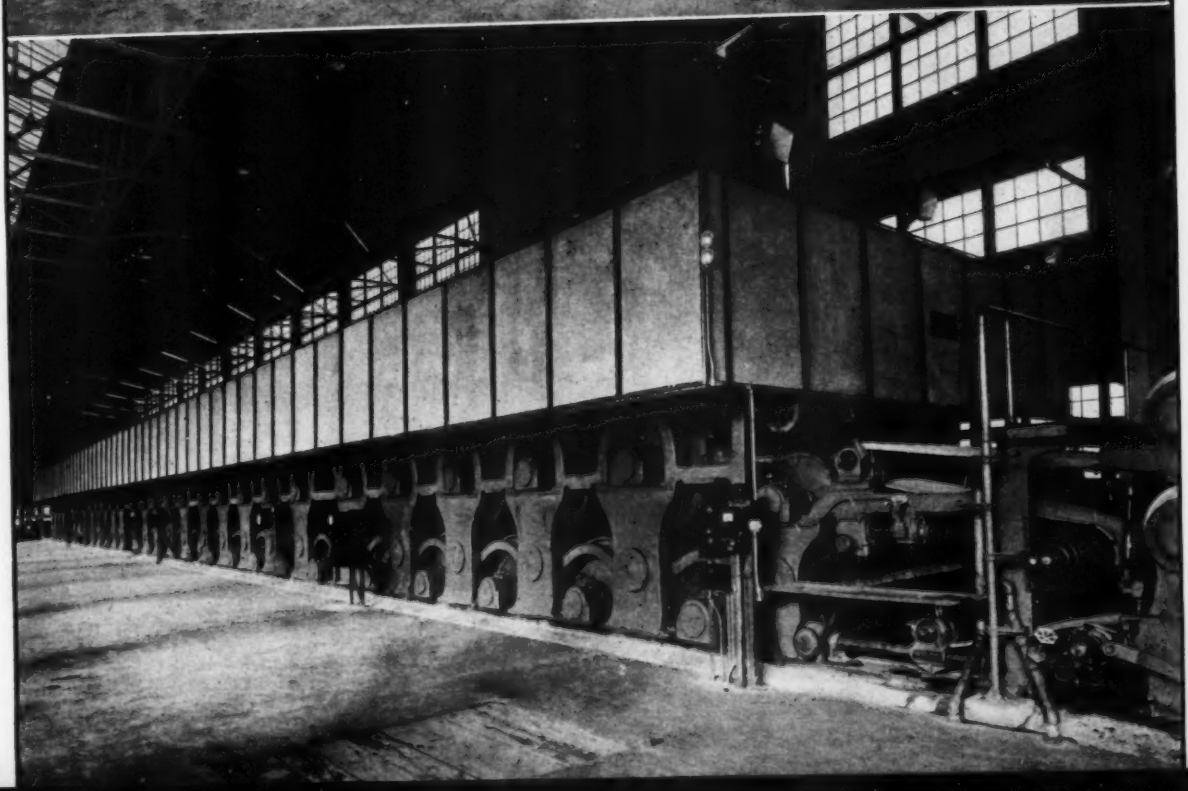
Gas is consumed in quantities of 15,-

(Concluded on Page 315)

Legends—Page 307

Three views of pulp drying machine. Top—Wet end; Center—Press section; Bottom—Dryer section





Crow's Nest

A seat in the crow's nest high over the deck of a ship gives the sailor a commanding view of the rolling sea.

Figuratively speaking, Black-Clawson and Shartle also are in the crow's nest. Through constant study of mill problems, they know what machinery is needed to better the making of paper.

Without this knowledge, there would be no B-C vat, vertical dryers, Tugboat Annie, or Rotobeater.

BLACK-CLAWSON and SHARTLE BROS.

ADVERTISING PAGES REMOVED

(Continued from Page 306)

000,000 to 20,000,000 cubic feet a day, and is furnished by the Houston Pipe Line Company.

Shipment of pulp may be by water or rail. A mill frontage of about 2500 feet on the Houston Ship Canal permits barges to be loaded for travel via the Intracoastal Canal, the Mississippi and the Ohio Rivers. In addition, it gives access to seagoing vessels for coastwise or foreign shipment. Rail shipment is over a spur of the Public Belt Railroad which connects with the numerous railroads entering Houston.

Responsibility for the actual building of the mill rested with Morton C. Tuttle Company, Boston, Mass., as general contractor and with J. E. Sirrine & Company, Greenville, S. C., as engineers.

On the operating executive staff at the mill are W. R. Crute and D. E. Cousins. Both of these men were connected formerly with the company's plant at Canton, Mr. Crute as plant engineer and Mr. Cousins as superintendent of the sulphate mill. Now they are plant manager and superintendent respectively.

The official roster includes Alexander Thomson, chairman of the board; Logan G. Thomson, president; and Reuben B. Robertson, executive vice president.

◆ ◆

◆ TAPPI to Meet at Savannah

Savannah was selected for the 1937 Fall Convention of The Technical Association of the Pulp and Paper Industry, October 18-20, 1937, due to the intense interest that is being created by the acquisition of new mills in the South along the Atlantic seaboard; as well as the kind invitation extended by the City of Savannah, who wish to make this meeting something in the nature of a welcome to the pulp and paper industry in this section.

The technical papers at the meetings will be of vital interest, the first day's session bearing on wood operations and economics, leading into the subject of pine pulping on the next day, and winding up with pertinent problems from the paper making end for the third day. As a sequence to these papers, arrangements have been made for a visit to the actual scene of woods operation as well as some of the first post-depression Kraft mills to come into production.

The middle of October was chosen as being an ideal time of the year, Indian summer, when the harvest moon will be shining in all its glory, and the City of Savannah through its local reception and entertainment committee will act as host, displaying that fine Southern hospitality for which Savannah is famous.

Headquarters will be at the DeSoto Hotel, which has unusual facilities, including a court garden and terrace with fresh water swimming pool. The Savannah Hotel will also offer excellent accommodations.

On the afternoon of the first day, cars will take the members and their ladies through the plantation section of South Carolina and timber preserves where logging operations may be seen. The return trip will be by boat over the beautiful inland water ways, with Uncle Henry serving mint juleps en route, arriving in Savannah in time for formal banquet and ball, given under the auspices of the City of Savannah; short talks by prominent conservationists and industrial leaders will inspire those at the banquet.

After the reading of the technical papers the morning of the second day and the noon luncheon, members will be given an opportunity to visit the mill of the Union Bag & Paper Corporation, Dr. Herty's Laboratory, and other industries in Savannah.

An informal dinner dance will be the big feature of the second night's entertainment. This will be in the nature of a costume party representing the crinoline days of the deep South, with prizes for the best costume. (Paper costumes will be available for those who do not bring their own.) A real Southern dinner will be served, the setting for which will abound in local color and atmosphere; negro spirituals and skit "Gone With the Wind" bringing characterizing details.

The afternoon of the third day will find the members and their ladies at Tybee Beach for an oyster roast and fish fry, supervised by the County, and served by the "chaingang," followed by seashore fun and an opportunity for a dip in the surf; returning that evening for an informal buffet supper and farewell party.

For the ladies, special programs have been arranged by the ladies' local reception and entertainment committee, including sightseeing, swimming, fashion show, golf, bridge and teas at some of the plantation homes.

There are several remarkably fine golf courses at Savannah, and an unusual type of tournament golf is being planned for the members and their guests to be held at the Savannah Country Club.

Those coming in by boat, train or car, previous to the convention, or those who wish to carry their travels further afterward, will find full information ready and available as to points of local interest and trips to other mills in this section.

◆ ROBERT C. CLARK, sales manager with the Graham Paper Company, Chicago, has resigned from that post effective June 30th to form a company of his own in San Francisco. Before his association with the Graham Company, Mr. Clark was sales promotion manager on the headquarters staff of the Zellerbach Paper Company, San Francisco. During his twenty years of service with the Zellerbach organization Mr. Clark served as manager or sales manager of many branch offices of the company.

◆ SMITH AND WINCHESTER Manufacturing Company, South Windham, Conn., has recently installed and set in operation bag making machinery at the U. S. Gypsum Company's Oakmont, Pa., plant.

Pulley Crown Does Not Cause Belt Slip

W. F. SCHAPHORST, M. E.

MANY belt users have the erroneous concept that there is more belt slip on a crowned pulley than on an uncrowned pulley. The idea seems to prevail that slip varies proportionately with the crown owing to the fact that most pulley wear occurs on the crown itself.

It is argued that since the peak of the crown is farther away from the center of the shaft than is the edge of the pulley, the velocity of the center of the belt is greater than the velocity of the edge of the belt and therefore, on account of this difference of velocity, there must be some slip to adjust things.

That is not true. There is no belt slip on a pulley due to adjustment of the belt to fit the crown. The reason why the crown wears down quickly under severe conditions is that the pressure per square inch is greatest on the largest diameter. Therefore, if the belt slips, the crown gets most of the punishment. Slip, of course, is greatest on the crown, but the higher pressure is the principal cause of the wear.

A prominent engineer in a lecture once declared that on account of crown and the difference in velocity at the edge and center there must be some corrective slip. It sounded plausible. At one time the author believed it, but now he is convinced that it is an erroneous theory.

The best way in which to disprove the theory is to consider a thick V-belt as it travels around a sheave. The inside moves at a lower velocity than the outside, yet there is no slip on the sheave due solely to that fact. An adjustment in belt length is made at the instant the belt is wrapped upon the sheave and again at the instant the belt leaves the sheave. The outside stretches and the inside compresses. The same is true with flat belts. The instant the flat belt curves onto the pulley it adjusts itself to the surface without slipping. The sides of the belt shorten. The center stretches a little more.

Of course, there is slip on the pulley face, but it is caused by creep and not at all by the fact that the pulley is crowned.

The amount of pulley crown is not standardized. Authorities vary, as follows:

Authority	*Crown*
Unwin	1/24 x width of rim
Morin	1/10 x width of rim
Molesworth	1/24 x width of rim
Scott A. Smith	Not over 1/8" for a 24" face
Others	1/8 to 1/65

Some of the above figures were recommended many years ago. Those who recommend one-tenth or one-eighth are rather out of date. It is now generally agreed by most of the leading power transmission engineers that low crown is preferable. Belts and pulleys are more perfectly constructed now than they were in the old days. Consequently high crowns are seldom necessary.

Economies Effected by Use of Geared Drives on Beaters

H. E. DRALLE, Application Engineer
Westinghouse Electric & Manufacturing Co.

GEARING, a necessary part of many machines, has been used so long and so effectively in the paper industry that further economical applications of it may not seem remotely possible. Recently, however, gearing has so admirably solved an unusual mill condition in a generally considered radical application to breaker beaters that its adoption for such drives must be given serious consideration where initial cost is paramount, where operating economies are important, and where space is at a premium.

Slow speed wound rotor motors or synchronous motors having high starting and pull-in torques long have been accepted as ideal forms of electric drive for belting to beaters. Admittedly, each of these types of motors has inherent operating characteristics that usually make it entirely suitable and in many instances, desirable, for such drives. However, the combination of a high speed wound rotor induction motor and reduction gear as shown in Figure 1 demands recognition of merit when considered comparatively, from the standpoints of first cost, operating economy, space requirements, and adaptation to existing plant conditions.

First cost, based on a 100 h.p. 327 r.p.m. drive, definitely is in favor of the high speed induction motor and speed reducer. This combination-motor gear reduction unit, flexible coupling and outboard bearing, all mounted on a common bedplate as a single drive and then on slide rails for manipulating as a single unit—has an initial cost of 25 to 30 per cent less than a slow speed wound rotor motor and 40 to 45 per cent less than a slow speed 100 per cent P.F. synchronous motor. If an 80 per cent P.F. synchronous motor is used, the difference in first cost is more pronounced, being in the order of 55 to 60 per cent more for the synchronous machine.

The table below shows comparative power factors and efficiencies and costs for the types of drives mentioned.

The comparatively low power factor of the slow speed induction motor is evident and expected. It is interesting, however, to compare the power factor of the high-speed induction motor with the synchronous motor drive.

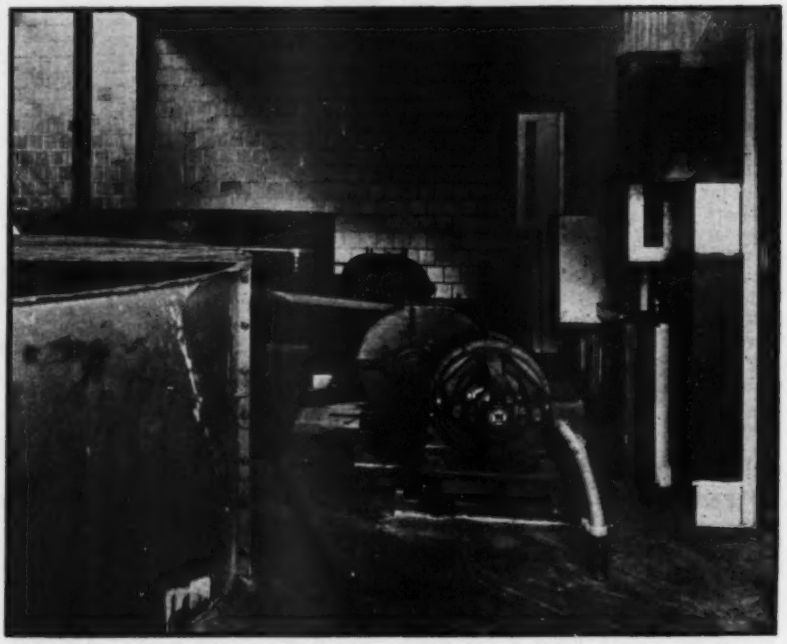


Fig. 1—High speed induction motors (wound rotor) with reduction gears driving breaker beaters on the first installation ever made of this type

Since the drives operate at nearly full load the major portion of the time, there is but little more corrective effect to be obtained with the 100 per cent P.F. synchronous motor than there is with the 94 per cent P.F. induction motor. The use of an 80 per cent P.F. leading synchronous motor makes a wider variation in first cost in favor of the induction motor and speed reducer and, therefore, presents the possibility that economical interests would be best served by the induction motor and gear with static condensers for any plant corrective kv-a. desired.

Considering over-all efficiency, there is little choice among the three drives, although any existing difference is in favor of the synchronous machines. This favorable advantage might be more than offset, however, by undesirable characteristics which would make the choice of induction motors and gears seem prudent. For example, if a plant furnishing its own power has limited generating facilities and is loaded to the point where the starting of large motors would disturb the voltage regulation causing flickering of lights and possible dropping of synchronous load, wound rotor induction motors would be the best type of drive to employ.

This is true because with wound rotor motors the starting currents, and of course the torques, can be limited to any predetermined value (50 to 200 per cent load) consistent with the plant generating capacity and operating requirements.

Synchronous motors for the same application must have high starting and high pull-in torques that require heavy current inrushes of the order of 400 to

Drive	Approx. Price	*Efficiency* ½ Load	¾ Load	Full Load	*Power Factor* ½ Load	¾ Load	Full Load
Slow speed wound rotor motor, 340 r.p.m.	$2600	89%	90%	91%	43%	55%	65%
Slow speed synchronous motor, 100% P.F., 327 r.p.m. with direct-connected exciter	$2750	88%	89%	90.6%	100%	100%	100%
High speed "CW" motor and speed reducer unit complete with outboard bearing and bedplate, output shaft 330 r.p.m.	$1940	86%	88.3%	89%	91%	93%	94%

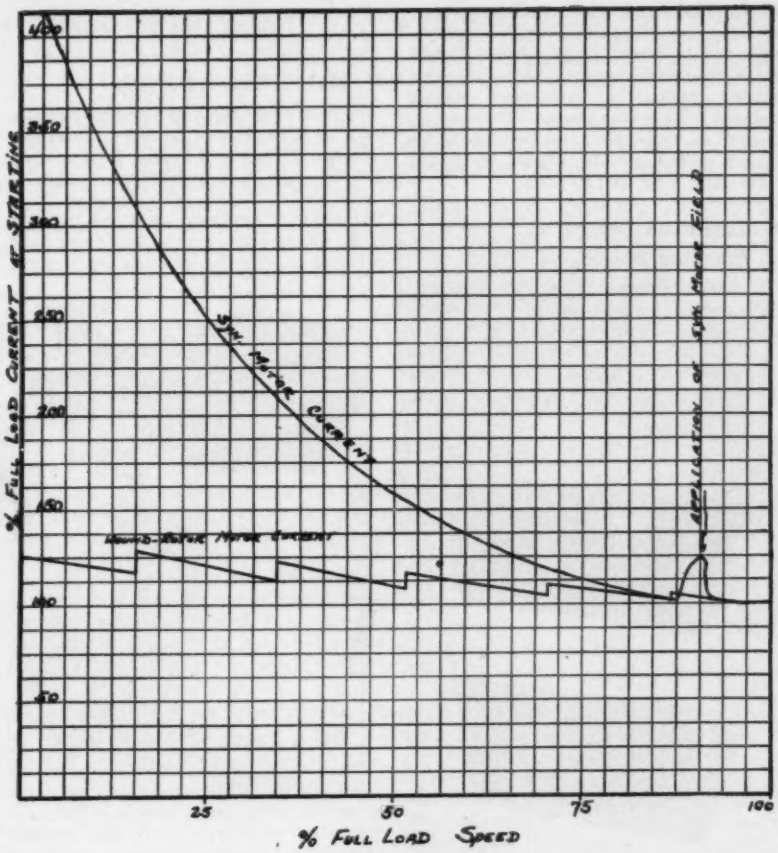


Fig. 2—Current curves during characteristic starting for synchronous and wound rotor motors assuming full voltage starting for synchronous machine and 125 per cent torque required at start

500 per cent of full load rating that will be obviously reflected in the plant operation. Where such conditions are objectionable, wound rotor motors must be used. (See Figure 2 for comparison in starting currents of the two types of motors.)

Performance of the high speed induction motor and gear as compared to the low speed induction motor belted directly to the beater shaft automatically dictates the use of the high speed equipment. Besides this, the first cost is decidedly in favor of this equipment which ideally meets all other operating requirements for any type of power supply. The successful performance of several installations over the past few years attests the practicability of these drives.

Accepted practice among paper mill operators and paper mill machine builders has not permitted the use of high speed wound rotor induction motors and gearing to date, but rigid adherence to preconceived ideas of design, form, or type of drive, is unwise. Surely an open-minded approach to the question of beater drives with full consideration given to the limitations as well as the advantages of each type will result in a more widespread use of high speed induction motors and gears, with resultant improved performance and lessened capital expenditure.

◆ C. H. CHAPLIN, who has been serving as assistant manager of the marketing division of Appalachian Coals, Inc., Cincinnati, Ohio, and H. C. Moore, formerly special representative for the company, are now members of the marketing division staff. In 1934-35, Mr. Chaplin served Appalachian Coals in its marketing division and prior to that time was associated with the Glen Alum Fuel Company as sales manager. Mr. Moore, who is well-known to coal producers and consumers in Tennessee, has been associated with the agency's market research department.

◆ SUCCEEDING W. J. LAWRENCE, who has recently resigned his position of general manager of the Paper Makers Chemical Division, Hercules Powder Company, is P. B. Stull, a Hercules director and formerly general manager of the company's Virginia Cellulose Department. The activities and organization of the Paper Makers Chemical Division will continue unchanged. Lloyd Kitchel, who has served as sales manager in the Virginia Cellulose Department since 1926, will become general manager of the department, filling the vacancy caused by Mr. Stull's promotion.

◆ WHEN THE LEIPZIG (GERMANY) Trade Fair gets under way this summer, from August 29th to September 2nd inclusive, it will mark its 1978th session; this historic exchange having been held without interruption for more than 700 years. More than 5,000 new products of Germany and other leading countries, including the United States, will be exhibited at this time. It is expected that about 200,000 business men from seventy-four countries will attend the fair which will render it the largest, as well as the oldest, industrial exchange in the world. The last fair's sales totaled $200,000,000 of which $64,000,000 was spent for export purposes.

◆ W. J. Lawrence Resigns From Hercules Powder Company

In order to devote his time to the many businesses in which he is interested in the Middle West and South, W. J. Lawrence, a director and vice-president of the Hercules Powder Company and general manager of its Paper Makers Chemical Division, has resigned from the organization. This action concludes a service of twenty-six years in the manufacture and sale of paper-making chemicals. During that period the use of PMC products became worldwide, not only in the paper business but in many other industries served by PMC.

Born in Nova Scotia in 1891, Mr. Lawrence graduated from the Shelburne Academy and entered the textile and paper chemical business. In 1911 he became an executive of the Paper Makers Chemical Company of Easton, Pa., and later, upon the organization of a number of companies into the Paper Makers Chemical Corporation, he was named president and general manager. When that company became affiliated with Hercules in 1931, Mr. Lawrence continued as president and was elected a director. The consolidation of Paper Makers Chemical Corporation with Hercules Powder Company in 1936 resulted in Mr. Lawrence becoming a vice-president and general manager of the new Paper Makers Chemical Division. At present, Mr. Lawrence is established in the American National Bank Building, Kalamazoo, Mich., and he will continue to reside in that city.

◆ FOR TWENTY-FIVE YEARS actively identified with General Refractories Company, Philadelphia, Floyd L. Greene has recently been elected president of that company. Previous to his election as president, Mr. Greene was executive vice-president. He was general superintendent of the Standard Refractories Company at the time of its acquisition by General Refractories in 1922 and became successively, district manager, general works manager, vice-president in charge of operations, executive vice-president and president. Mr. Greene is also a director of several of the subsidiaries of the parent company, a director and member of the executive committee of the American Refractories Institute and vice-president and a director of the First National Bank of Claysburg, Pa.

◆ Devices for Controlling Down Time

The National Acme Company, 157 East 131 St., Cleveland, Ohio, has announced two new model "Chronologs" for provid-

ing mechanically a printed record of machine operation. Both of these models are simpler in construction and in operation than the previous models. One of them, Model M, records not only the pro-

ductive and down time, but also the number of units produced and the reason for any interruption in operation. Only idle time or units produced is recorded by the other new model, Model O.

◆ Motor-Starter

The Allis-Chalmers Manufacturing Company, Condit Works, Boston, Mass., has announced an across-the-line air motor-starter which is equipped with arc-depotentiating chambers. These chambers, designated as Ruptors, are stated to greatly increase the interrupting ability of the contacts and to form an isolating barrier between contacts of opposite polarity. Other features of the starter, mentioned by the manufacturer, include: vertical make and break-silent operation, enclosed temperature overload relays, unit construction, large silver double break contacts, contacts accessible and quickly renewable, and pilot circuit isolated from motor circuit. The starter, known as type AP-7, is furnished for 7½ hp. at 440 and 550 volts; 5 hp. at 220 volts; and 3 hp. at 110 volts.

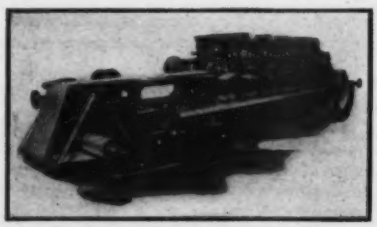
◆ Improved Design of Elevator Bucket

Link-Belt Company, 2410 W. 18th St., Chicago, Ill., has announced the development of an improved design of elevator bucket. The new bucket, designated as the Super Salem bucket, is reinforced at the digging lip, front corners and along

back. It is made of steel, stainless steel, copper, brass, aluminum or Monel metal of either No. 24 or No. 18 gauge. Widths and depths of the bucket range from 2½ inches to 8 inches, while lengths are up to 30 inches.

◆ Bag Printing Machine

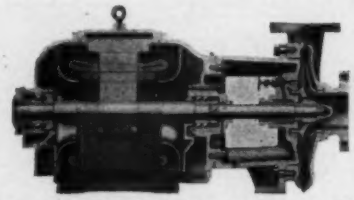
A bag printing press, which prints by letterpress, dry offset or gravure from curved electros, stereos, rubber plates and chrome plated engravings and which allows the type cylinders to be changed to produce any desired feed length, has been announced by the Chambon Corporation, Garfield, N. J. This press,



known as the new Chambon-Champlain bag printing press, prints on any kind of paper and other materials such as cellophane and metal foil, rewinding for use in the bag forming machines. Registration in the bag forming operation is obtained through the use of a perforator on the press or with a Champlain photo-electric cell control.

◆ Motor-Mounted Pump

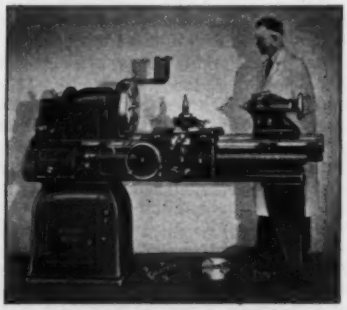
A motor-mounted centrifugal pump, built in capacities of from 5 to 1200 gallons per minute and heads of from 10 to 230 feet, has been announced by the De Laval Steam Turbine Co., Trenton, N. J. The pump is mounted upon the end bell of an electric motor, the two forming a compact and self-contained unit, with



only one shaft and two bearings. The pump casing is of cast iron, while the impeller, wearing ring, shaft sleeve, stuffing box gland and lantern ring are of bronze. Special materials can be supplied where required. All parts subject to wear are interchangeable; and all pump parts can be removed without disturbing motor.

◆ Underneath Belt Motor Drive Lathe

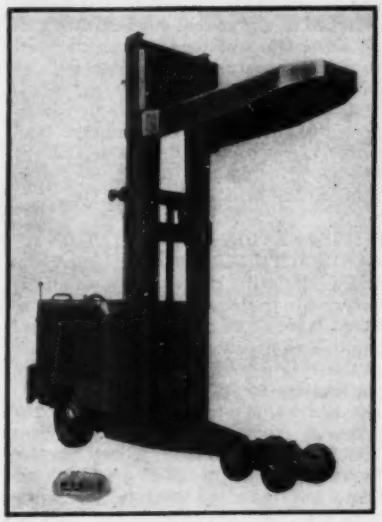
The South Bend Lathe Works, South Bend, Indiana, has announced a new line of back-geared, screw cutting, precision lathes in which the motor and driving mechanism of each unit is enclosed in the cabinet leg underneath the lathe headstock, power being transmitted from the motor to a countershaft through a V-belt, and from the countershaft up through the lathe bed to the headstock cone pulley by a flat leather belt. A belt tension release lever, located on the front of the cabinet leg, permits easy shifting of the cone pulley belt; while a reversing switch permits the lathe spindle to be started, stopped, or reversed from an



easy working position in front of the lathe. Among the other features cited by the manufacturer for this line of lathes are: Heat-treated headstock spindle with all bearing surfaces hardened and ground, including the taper hole; spindles of special alloy steel with line bored and lapped phosphor bronze bearings; double wall apron with self-oiling steel gears, all gear shafts being supported on both ends; and a multiple disc friction clutch in apron.

◆ Telescoping Lift Truck

The Baker-Raulang Co., Cleveland, Ohio, has announced a 5-ton lift truck which has a maximum lift of platform above the floor of 106 inches and a nested height of 88 inches. Hoisting of the platform is accomplished by two double, alloy steel roller chains. The hoist controller operates through a magnetic blow-out, mill-type contactor. This contactor is connected to the hoisting mechanism in such a manner that it is automatically returned to neutral at the



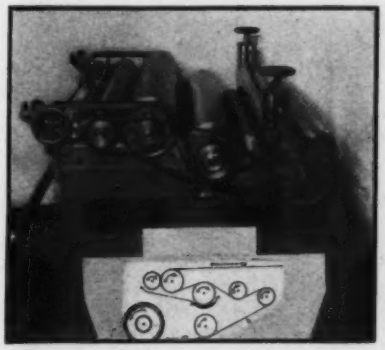
upper and lower limits of the platform travel. The platform, commonly 26½ inches wide by 54 inches long by 11 inches high in lowered position, may be varied somewhat in dimensions to suit requirements. Frame is of steel plate that is arc welded and hot riveted through drilled holes reamed to size in place during assembly. Upright members are heat treated alloy steel castings in channel form. Trailing axle is of the tandem type which is articulated and is fully compensating in both longitudinal and transverse directions. The truck is known as Type HH5.

◆ Acid Resisting Alloy

Haynes Stellite Company and Union Carbide and Carbon Research Laboratories, Inc., two units of Union Carbide and Carbon Corporation, 205 East 42d St., New York, N. Y., have collaborated in the development of a nickel, molybdenum and iron alloy primarily for service in equipment handling hydrochloric acids in all concentrations and at temperatures up to and including the boiling point. The alloy, known as Hastelloy B, also stands up well in sulphuric and phosphoric acids, in acetic and other organic acids, and in non-oxidizing acid chloride solutions. Among the different forms in which the alloy is available are castings, wrought parts, rolled plate and sheet, wire and welded tubing. It is suggested by the manufacturer for such applications as agitator units, heating and cooling coils, pumps and pump parts, condensers, valves, pipe and fittings.

◆ A Roller Coater

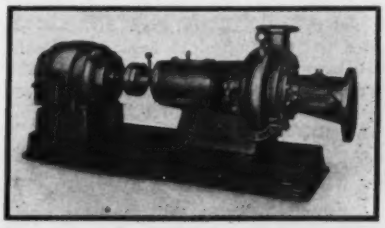
Colloid Equipment Company, 50 Church St., New York, N. Y., has announced a roller coater, designated as the Meadows roller coater, for the application of lacquers, rubber solutions, metallic coatings, lacquer emulsions, and



other materials. The machine is made in widths from 40 to 70 inches, for operating speeds from 75 to 225 feet per minute, with a furnisher roll separate from the metering rolls, and with or without a knife coating attachment. Likewise, a circulating pump and automatic level control for the coating material in the furnish pan can be supplied, as can drying boxes or festooners to match the production of the coater head. Other auxiliary equipment that can be furnished with the coater includes embossing heads, slitters, winders and combination machines.

◆ High Consistency Centrifugal Paper Stock Pump

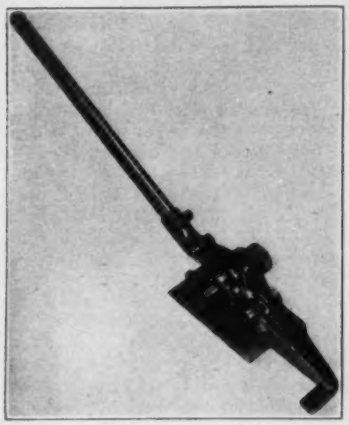
Worthington Pump and Machinery Corporation, Harrison, N. J., has developed a centrifugal paper stock pump that is stated to be capable of handling paper stocks of all kinds and consistencies up to 6½ per cent and even higher con-



sistencies in special cases. The lower half casing is cast integral with the foot piece and bearing bracket for rigidity. Both the casing and bearing bracket is angle split, permitting ready access to the interior of the pump without disturbing piping and driver. A heavy oversize shaft, mounted on heavy duty, double-row ball bearings, prevents deflection. The impeller, of the open, non-clogging type, has two combined screw-and-radial streamlined vanes. The screw conveyor end, integral with the vanes, projects far into the suction nozzle and picks up the incoming stock. A stopper piece in the suction nozzle prevents prerotation and air binding. The stuffing box is provided with separate water seal and lantern type seal ring. Capacities of the pump, which is made in six sizes, range from 100 to 3500 g.p.m. against total dynamic heads of 10 to 160 feet.

◆ Steel Strapping Tool

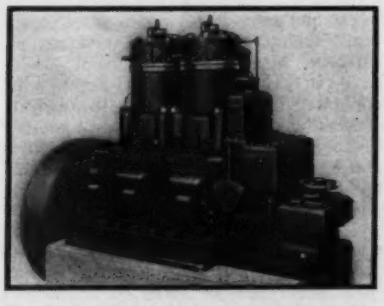
An improved tool for tensioning strapping around large and heavy packages and bundles has been developed by the Signode Steel Strapping Company, 2600 N. Western Ave., Chicago, Ill. This tool, known as Model No. 3 direct drive stretching tool, has an automatic gripper action which is controlled by the handle.



The drawing back of the handle, when the tensioning operation is completed and the joint made, disengages the drawing and holding pawls, frees the windlass and releases the strap gripper. Among the other features cited for the instrument by the manufacturer are: hardened gripper plate, smaller diameter windlass shaft, finer spacing of teeth on ratchet wheel, and a long solid base.

◆ Diesel for Small Power User

Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill., has developed a Diesel engine, Model 42-E, to meet the demand of small power users for a heavy duty, continuous service stationary unit. It is available in two-cylinder and three-cylinder combinations with ratings of



60 and 90 hp. at 450 r.p.m. and can be furnished for direct-connected, belt or electric generator drive. Among the outstanding features of the engine, cited by the manufacturer, are: two-cycle, direct airless-injection of fuel; cylinder and head completely water jacketed; auto-

matic lubricating system; large main bearings; simple and convenient starting controls; open-head combustion, differential injection valve; needle or quill roller type piston pin bearings; backflow scavenging, power impulse on each downward stroke; and cylinder heads simplified by the elimination of air inlet and exhaust valves.

◆ George A. Rhoads

Forty-nine years a member of the firm of J. E. Rhoads and Sons, Philadelphia, Pa., George Ashbridge Rhoads, senior member of the firm, passed away May 8 at the age of 76 after having been ill for several days.

Born in 1860 at the old Rhoads homestead near Springfield, Delaware County, Pa., Mr. Rhoads came to Wilmington in 1868 when his father established the tanning and leather business that bore his name. After a few years with the Glasgow Iron Works at Pottstown, Pa., he became a part of the Rhoads organization and in 1890 married Miss Frances C. Tatum of Wilmington, Del. Mrs. Rhoads died in 1931 and Mr. Rhoads married Mrs. Alice Carter Rhoads, widow of his brother, John B. Rhoads, in 1933.

Mr. Rhoads is survived by his widow and four daughters.

◆ ALDERMEN OF MARINETTE, WIS., recently granted the use of a strip of land 200 feet long and 350 feet deep located at the municipal dock, to the Southern Kraft Corporation for the storage of wood pulp. The company expects several boats of pulp to arrive this season and desires adequate facilities for handling it. Southern Kraft will have the use of the land for two years with a ten year option.

◆ CUTLER-HAMMER INC., Milwaukee, Wis., have opened new offices in Youngstown, Ohio, and have placed E. J. Gove of the latter city in charge. The new office, which is a branch of the company's Pittsburgh station, will provide better service to customers located in the Youngstown area.

◆ SUCCEEDING WILLIAM J. HAJEK as vice-president and general manager of the Brown Instrument Company, Philadelphia, Pa., is E. B. Evleth, who formerly had served as resident vice-president in charge of the mid-west region with the Minneapolis-Honeywell Regulator Company, Chicago. Mr. Evleth was appointed to his new post following the retirement of Mr. Hajek due to ill health. C. L. Saunders, former regional sales manager, will succeed Mr. Evleth as resident vice-president for the Minneapolis-Honeywell Regulator Company.

◆ Bogalusa and Gaylord Plan Consolidation

A plan for the consolidation of the Bogalusa Paper Company with Robert Gaylord, Inc., has been submitted to stockholders of the Great Southern Lumber Company which controls the Bogalusa Paper Company. The new company is to be known as Gaylord Container Corporation and it will operate pulp and paper mills and manufacture containers and paper bags.

This reorganization will entirely separate the timber interests of the Great Southern Lumber Company and the paper manufacturing operations of the Bogalusa Paper Company. The latter company owns about half the preferred stock and 25 per cent of the common stock of Robert Gaylord, Inc., which company has been engaged in the manufacture of containers, and through its associated company, the Gaylord Bag & Paper Company, also engages in the manufacture of paper bags.

◆ FEDERAL JUDGE Clarence G. Galston of the United States District Court, Eastern division of New York, recently handed down his decision in the action of the Dixie-Vortex Company against Lily-Tulip Cup Corporation. The decision upheld the prior rights of the Dixie-Vortex Company as owners of the Wessman-Stone patent to manufacture by the methods protected by the sustained claims of the patent. The suit was based on alleged imitation of Dixie Cups in dimensions, appearance, etc., with alleged resulting substitution.

◆ THE REMOVAL OF its New York office to larger quarters at 61 E. Eleventh Street has been announced by the Ideal Commutator Dresser Co., Sycamore, Ill. The new quarters will include a completely equipped showroom with modern all-steel shelves and showcases on which Ideal products will be displayed. In moving to larger quarters, the Ideal company points out that the step was made in recognition of the need for better service in the motor maintenance field and was in keeping with the company's progress.

◆ THE NEW DISTRICT sales manager for Minnesota and adjacent territory for the Columbia Alkali Corporation is J. R. Bush, whose appointment was announced recently by W. I. Galliher, director of sales for the Columbia firm. Mr. Bush will have offices at 616 S. Third St., Minneapolis, Minn., where he will supervise the distribution of Columbia's line of products.

◆ New Production Plan For Patterson Foundry

A comprehensive plan to double the production facilities of the Patterson Foundry and Machine Company, East Liverpool, Ohio, has recently been announced by Richard L. Cawood, president of the company. As an initial step in the program, additions to the machine and fabricating divisions have increased the capacity of these two departments approximately fifty per cent while the construction of the new tunnel kiln at the Porox division is expected to greatly increase the production of the porcelain lining blocks and grinding balls made in that department.

Improved business conditions have made the expansion program at Patterson an absolute necessity in order to maintain a satisfactory production schedule and through the contemplated increase in production facilities, it will enable the company to approach new markets for their line of crushing, grinding, mixing and processing equipment.

◆ WITH AN ITINERARY which includes the larger cities of the East, Midwest and South, the traveling exhibit of the most recently developed switch-gear equipment sponsored by General Electric, will be able to demonstrate working models directly to the prospective buyer. Designed as a practical demonstration of the advantages of modern circuit-interrupting apparatus, the exhibit will be shown to leading central station, industrial and transportation executives in key cities throughout the country. The exhibit places particular emphasis on the oil-blast principle of circuit-interruption in oil circuit-breaker construction.

◆ THE NATIONAL ASSOCIATION OF MANUFACTURERS has published statistics estimating the extent to which the reciprocal trade agreements have affected labor. The number of man hours required to produce the paper and paper products imported in 1936 in excess of the imports for 1935 is given as 21,809,000, while that required to produce the excess of exports in 1936 over 1935 was 3,500,000 hours. This is a net loss for American labor in 1936 of 18,289,000 hours, equivalent to the loss of a year's work for over 9,000 men.

◆ New Mill in Trinidad To Use Bamboo

Champs Fleur, Trinidad, British West Indies, is the site of a mill which has recently been completed and which was reported ready for operations for the production of pulp from bamboo, beginning May of the current year.

The mill itself consists of a crusher house, a chemical store, acid preparations plant, digester, machine house and power plant. The entire roof and sides are protected with asbestos sheets.

Although the mill is situated on an estate of 1,000 acres on which grows enough bamboo to keep it supplied indefinitely, private individuals will find a market for bamboo there, inasmuch as the mill intends to supplement their private stock from outside sources. The pulp will be shipped in 400 pound bales to Great Britain for manufacture into paper by the parent company.

◆ AT THE ANNUAL MEDAL meeting of the Franklin Institute of Philadelphia, May 19th, Richard T. Erban was presented with the Longstreth medal for outstanding contribution to science by the invention of the Transitorq; an adjustable speed transmission developed by the New Departure Division of General Motors Corporation.

◆ DR. EARL G. STURDEVANT has been appointed consulting engineer of the electrical wire and cable department of United States Rubber Products Inc.,

according to a recent announcement by that company. Dr. Sturdevant has been with U. S. Rubber since 1929 and has been instrumental in the development of "Lastex," the miracle yarn used in elastic garments.

◆ C. C. VAN STRY of the Cameron Machine Company, Brooklyn, N. Y., is supervising the erection of three new mill type winders at Arpley, Warrington Lancs, plant of the Thames Board Mills, Ltd., England. Two of the machines are 116 inches wide with 60 inch rewind capacity. The third machine is a 72 inch winder also with a 60 inch rewind capacity.

◆ THE WORTHINGTON PUMP and Machinery Corporation, Harrison, N. J., has announced the appointment of J. J. Summersby, assistant vice-president, as general sales manager. Mr. Summersby joined the Worthington organization immediately after post-graduate work at Washington University in 1920 and has been continuously identified with the corporation since that time as district sales manager, divisional sales manager and assistant general sales manager.

◆ A New Use for Binoculars

W. W. Johnstone, of the San Francisco office, reports a new and novel use for binoculars and spotting scopes recently tried by the Weyerhauser Timber Company, Everett, Wash. The pulp digesters used by the company are lined with brick and it is necessary to inspect this lining for pitting and erosion, particularly near the bottom.

The digesters are about 52 feet deep and 17½ feet in diameter, tapering to a valve opening about 2 feet in diameter, the rim of which is a critical point of inspection.

Says Johnstone, "We tried the 7X 35mm. I.F. Binocular and the draw tube spotting scope. It was necessary to lower a powerful Mazda lamp bulb down to the sections to be observed and to lean over the opening at the top and look down vertically—an awkward position for the use of a 20X glass.

"Another detriment to high powers is the fact that the digester must be inspected immediately after discharge when the heat is intense."

The 7X 35 glass proved very effective. A recommendation was made by Johnstone that a reflector be used on the lamp to prevent back-flare and disturbing reflections from the brick surfaces and that the 7X 50 be tried to secure maximum light value for this power.

◆ New Department Created at Crane Company

P. R. Mork, vice-president in charge of sales at the Crane Company, Chicago, has announced the appointment of W. H. Pape as manager of the company's new valve and fitting department. The new department has been created recently to co-ordinate all the activities concerned with the estimating, engineering, or sales of valves, fittings, pipe and fabricated piping into one unit. Mr. Pape enters his new position with twenty-five years' experience covering a wide range of industrial applications of Crane products. His first activity was in heavy railroad construction followed by similar work on New York subways. In 1914 he entered the oil industry serving subsequently as designer, operator and sales engineer. Joining the Crane organization in 1927, Mr. Pape became special representative in New York and Boston and for six years was in the Oklahoma and Gulf Coast oil fields. He has been manager of the oil sales department at Chicago for the past 1½ years.

As a result of the departmental consolidation, E. Burke has become manager of the engineering sales section of the valve and fitting department while G. F. Wright has become assistant manager in charge of estimating and other activities dealing with fabricated pipe and allied products. W. F. Lahl is assistant manager in charge of the supervision of the industrial zone men in the field and J. H. Barker is manager of the sales quotation section. Other sections of the new department include pipe sales, marine sales, oil sales, railroad sales and water works sales.

◆ S. D. MAHAN, formerly manager of merchandising advertising, has been appointed general advertising manager of the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.

Few paper production applications require service as severe as that demanded by the deep well pumps upon which the water supply of so many plants depends. Never failing service over an extremely long life span is fundamental. Loads and speeds have become progressively greater. A leading maker of deep well pumps gave ROLLWAY the problem some years ago at a time when no bearing equal to the requirements was available. A solution was worked out by ROLLWAY engineers using ROLLWAY principles of cylindrical bearing design. Dependable and satisfactory operation resulted; thousands of ROLLWAYS have followed to fill this position through the years.

ROLLWAY BEARING CO., INC., SYRACUSE, N. Y. Factory Representatives in—Boston, Chicago, Cleveland, Detroit, Philadelphia, Pittsburgh and Youngstown. Agents: Houston, Texas; Tulsa, Okla.; Birmingham, Ala. Pacific Coast Representative—Precision Bearings, Inc., Los Angeles, San Francisco, Portland and Seattle.

CYLINDRICAL ROLLER **ROLLWAY BEARINGS**

See the Rollway Exhibit at the Paper Progress Exhibit —June 23 to 25—Booth 87.

◆ New Catalogues and Publications

Alexander Brothers, Inc., Philadelphia, Pa.—A very informative bulletin which explains the use and design of the Tentacular transmission belt, has been issued recently by this company. Thirty-two pages of charts, tables, diagrams and detailed explanatory literature make this publication a thing of practical value.

Allis-Chalmers Manufacturing Co., Milwaukee, Wis.—Bulletin No. 1643-B deals with the paper stock pump manufactured by this company. Charts showing the friction of paper stock in cast iron pipes and many sectional drawings of the pump itself are featured throughout.

Bausch and Lomb Optical Co., Rochester, N. Y.—Catalogue No. D-221, a publication dealing with the spectrometric equipment the company sells, explains the basic theory and design of spectrometers and illustrates the types of spectrometers that are available for industrial use. This book, twenty-four pages in length, is adapted for loose-leaf filing and contains many interesting features.

Beaver Pipe Tools, Inc., Warren, Ohio.—A bulletin devoted to information regarding the Model-A cutting unit has been issued lately by this company. Photographs and data tables give complete information about this portable unit for cutting and threading pipe bolts.

Bristol Co., Waterbury, Conn.—This company has issued a bulletin regarding its process control systems, which illustrates how and in what manner they are used in modern industrial plants.

Brown Instrument Co., Philadelphia, Pa.—An extremely attractive catalogue (No. 3005), which shows how waste occurs in combustion and which explains the action of electric meters, has been published recently by this company. Bound with a bright silver cover, this twenty-four page presentation is replete with excellent photographs and well-written explanatory material.

De Laval Steam Turbine Co., Trenton, N. J.—Power and heat problems are explained fully in this company's newest bulletin which has in it many interesting features regarding steam turbines.

Fairway Laboratories, Inc., Belleville, Ill.—Two new booklets put out by this company deal with salt tablets and their place in the modern and safe industrial plant.

Fairbanks, Morse and Co., Chicago, Ill.—Three new brochures issued by this company illustrate the use of centrifugal fire pumps, self-oiling power pumps and industrial centrifugal pumps. All three bulletins contain brief but well-organized material regarding the items mentioned.

Falk Corporation, Milwaukee, Wis.—Thirty-five pages of very well written material and detailed graphs and drawings make up the presentation of the company in its new Bulletin No. 4100. Punched for loose-leaf purposes, this publication is one of interest and value, with many excellent photographs and illustrations of the flexible couplings the company manufactures. It is bound with a blue cover and the same color runs throughout the entire edition.

Flexrock Co., Philadelphia, Pa.—A new bulletin which shows how this company's product is used to resurface factory floors has recently been published. In addition to illustrations of the product there are several testimonial letters published from firms which have used the resurfacing material.

E. Fuess, Inc., New York City.—A broadside which explains the principle of the Bekk smoothness tester and how it is used to measure printing smoothness, has been issued recently by this firm.

General Electric Co., Schenectady, N. Y.—Four new bulletins which contain complete information regarding pressure and vacuum switches, low speed synchronous motors, lighting protective equipment and watthour meters have been issued recently by the company. Blueprints, photographs and diagrams serve to make these presentations, three of which are in loose-leaf form, extremely valuable as data references.

Ingersoll-Rand Co., New York City.—A catalogue which describes its Cameron Motorpumps has just been released by this company. The pumps are compact machines combining electric motor and centrifugal pumps in a single unit.

International Nickel Co., New York City.—Two informative bulletins which contain technical data concerning the machining of monel, nickel and inconel have been published recently by this company. One of the publications lists the established uses of monel in pulp and paper mills and the other (T-12) presents detailed literature regarding tool design, toolsteel, cutting compounds, planing, thread chasing and other similar material.

Link-Belt Co., Chicago.—A leaflet which sets forth the advantages of the new steel elevator bucket this company has devised, along with illustrations of other types that are on the market, has been circulated recently by the firm.

Metalspray Co., Los Angeles, Calif.—A single gun covering the entire range of the process of metal spraying is described fully in the new folder put out by this organization.

Mine Safety Appliances Co., Pittsburgh, Pa.—An interesting bulletin which describes the use of a combustible gas indicator; an instrument which locates gas leaks and tests questionable atmospheres; has been issued lately by this company.

Oliver United Filters, Inc., New York City—Bulletin No. 206 devotes fifteen pages to well-worded and well illustrated views concerning vacuum filtration and vacuum thickening. Showing first the advantages of vacuum filtration, the bulletin later explains how this operation is carried on by use of the filters the company manufactures.

Patterson Foundry and Machine Co., East Liverpool, Ohio—A deluxe style offering is the new publication of this company, which presents, by use of an attractive green booklet, the line of agitators and mixers it handles.

Geo. P. Reintjes Co., Kansas City, Mo.—This bulletin, No. 201, illustrates furnace structures and arch constructions and brings out many interesting points regarding these two features.

Reliance Electric and Engineering Co., Cleveland, Ohio—Disc-brake motors is the theme of this loose-leaf bulletin. Parts, ratings and the brake design itself are explained by the company's new presentation.

Republic Steel Corporation, Cleveland, Ohio—A very attractive 20-page booklet with a three-color, varnished cover has just been released. Entitled "The Path to Sheetmetal Permanence" it completely describes the development, uses and physical properties of Toncan iron and contains many photographs of industrial uses of the product. The advertising division of the company will supply copies on request.

Roots-Connersville Blower Corp., Connersville, Ind.—Various types of water systems and their advantages are set forth in a new folder which has been circulated by this company.

Skybryte Co., Cleveland, Ohio—Using *"Commercial Housekeeping"* as its theme, this new catalogue presents in an interesting manner, the purposes and uses of the cleaning material and paints the company manufactures. A handy application index at the back of the book shows the type of paint that is needed for a specific condition.

James Campbell Smith, Inc., Cleveland, Ohio—A folder which illustrates the use of the coal-fired air heater for air heating and air conditioning, has been released recently by the company.

Stonhard Co., Philadelphia Pa.—A small leaflet presents the advantages of the material the company manufactures for the building of industrial floors and the repair of broken floors.

Terry Steam Turbine Co., Hartford, Conn.—Filled with excellent photographs and well-organized reading matter, the latest publication by this company gives one a clear idea of the working parts of the turbines this organization has on the market.

Worthington Pump and Machinery Corp., Harrison, N. J.—An attractive catalogue which illustrates the various types of air compressors put out by this firm has been issued recently by the company. Detailed drawings and photographs serve to give the reader a complete picture of article thus described.

Yarnall-Waring Co., Philadelphia, Pa.—Spray nozzles for air conditioning and general industrial usages are described fully in this company's newest publication.

BOOKS

A Text-Book of Paper-Making—A reissue of the fifth edition of this famous British work by C. F. Cross and E. J. Bevan has made its appearance. The first edition was issued in 1888, the original fifth edition in 1919, and the re-issue of the fifth edition in 1936. The re-issue of the fifth edition contains, in part, individual chapters on cellulose; physical structure of fibers; special treatment of various fibres; bleaching; beating; sizing, loading; the colouring of paper pulp; paper machines; calendering, cutting; caustic soda, recovered soda; paper testing; general chemical analysis for paper-makers; and special manufactures. The Chemical Publishing Co. of N. Y., Inc., 148 Lafayette St., New York, N. Y., acting as exclusive agents for the book in North and South America, quote an American selling price for it of $6.00 per copy.

Phillips Paper Trade Directory of the World—The 1937 edition of this directory, now established for over thirty years, has been released by the publisher. The general make-up of the book is similar to former editions with the orange colored cloth cover which has distinguished the book for a number of years retained. In addition to the alphabetical listing of the paper mills of the world by countries, the book contains much other information of value. There is, for example, a glossary of trade terms with French, German, Spanish, Italian and Swedish equivalents; a section on trade customs; another on the paper, wood pulp and allied trades associations of Great Britain; an extensive chapter on watermarks and trade names; and a number of other sections containing important data on the trade. The book is a work of approximately 900 pages and is priced at twenty-one shillings per copy. S. C. Phillips & Co., 47 Cannon St., E. C. 4, London, England, is the publisher.

Titanox Pigments in the Paper Industry—This publication is a reprint of fourteen articles by William R. Willets, each of the articles having appeared individually during the past few years in the literature of the pulp and paper industry. The compilation brings practically all of the published work upon titanium pigments by the author into one convenient publication and through it presents much helpful information upon the manufacture and properties of titanium pigments as well as upon their use in papermaking. It is a publication of approximately 50 pages with a page size of 8½ in. by 10¾ in. The reprint was issued by Titanium Pigment Corporation, 111 Broadway, New York, New York.

Accident Reduction in Fleet Operation

FRED E. KUNKEL

"WE THOUGHT accidents were matters of chance, the weather, car condition, etc.," explained a paper manufacturer recently interviewed, "but after thorough investigation we found that a certain group of men contributed each year about fifty per cent of the accidents.

"Take a group of ten drivers with thirty accidents a year. We found that the men who drove the greatest mileage didn't necessarily have the most accidents. Speed was found not to be a factor. Neither governors nor other traffic devices stopped accidents. Whether pleasure car or truck, the record was the same.

"As our studies progressed we saw no hope for controlling accidents with some outside pressure such as speed reduction or teaching them to drive carefully, or inflicting penalties. No matter what form our efforts took, our record did not indicate any chance of changing the accident prone driver.

"As a base for obtaining a record we started with accidents reportable to an insurance company, and we did not classify other accidents. The question came up whether a man should be charged with accidents in which he was not driving, and the contention by the men and the supervisor was that his record should not be charged with any accident which occurred while the car was in a stop position.

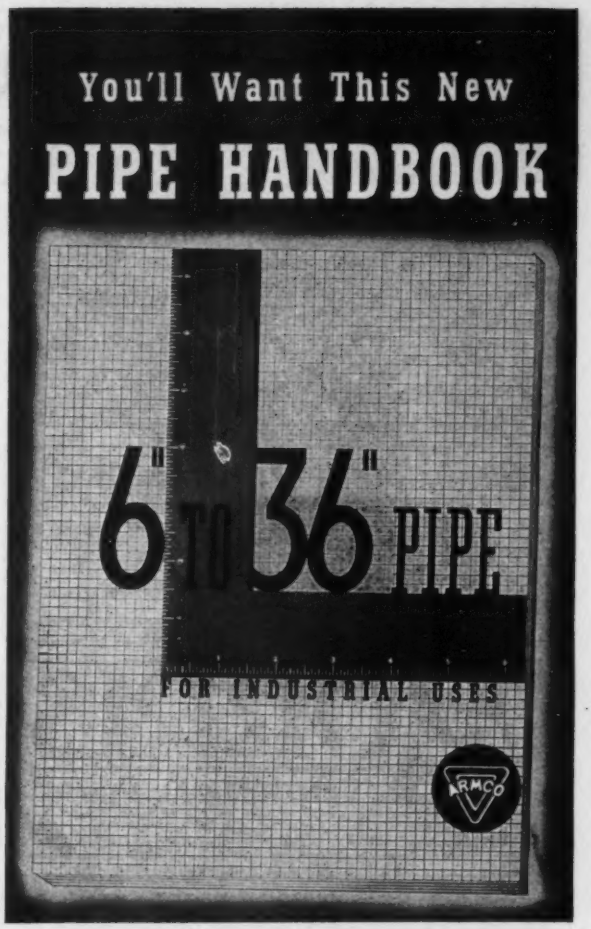
"But we found that the same men were having accidents either in parking, or after having parked, or by being bumped into the rear by stopping suddenly and unexpectedly. So we decided to classify them as accidents too and charging the men with them. We found that these accident prone men did not use good judgment as to whether to park near a busy corner instead of a side street, or parking double in the most impossible places, and if they came to a sudden stop, they never used an arm signal, and they always took chances in stopping the car in plenty of time with their brakes, with the result that a rear end collision was inevitable. Their judgment just wasn't there.

"We also found that the mechanical condition of the car was not a factor in accidents in its operation. We didn't find any difference in moving a man from an old car to a new car. There was absolutely no change in improvement in that man's accident rate.

"The big point was how should it be corrected? We soon found that you cannot educate that man into having fewer accidents. In the first place you cannot tell what caused the accident. You can read hundreds of accident reports in an insurance company office and talk to the men afterwards. You can limit your investigation to your own group and the result is the same. Regardless of a man's honesty, he naturally reports the accident in the most favorable light. You cannot take an accident report and believe it. One man will only see a portion of it. Psychology is a peculiar thing. It is intangible, unreliable. One man has his version, and the man with whom he was involved in an accident has still another version. The two stories never agree. And in all these cases we made no attempt whatever to place the blame. We couldn't.

"You can talk about reckless driving and speed, and all that, but until you have given a lot of thought to a definition of what constitutes reckless driving, it looks easy. That is the real trouble, finding the exact definition. It can't be done. Only one thing you can say is that some one does not drive the way you would. Speed has nothing to do with it. You cannot find any one who can really define reckless driving. You cannot legislate it. The only thing I know of that has any value is the plan used in Rhode Island. After a man has a certain number of accidents he is not permitted to drive any more on the public highways.

"And so we came to the conclusion that it was not a question of reduction of speed, or of brake inspection, or of weather conditions, nothing at all except the unsafe driving



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by a man who is not fit to drive. So we began looking for accident frequency. We took a group of accident prone drivers and attempted a prediction. Accidents were plotted in one direction and time in another. And we could soon definitely predict when that driver would have his third, fifth or seventh accident. It was generally a straight line. The startling thing about this graph was the striking accuracy with which these predictions came true. Only occasionally did we find a man who deviated from this law of expectation. The study turned out not only to be true but it was exceeded. And from that time on we began to look to men rather than equipment or the factors surrounding the accident.

"Having discovered that it was the men who caused the accidents and not the equipment or road hazards, we made certain efforts to censure the men and to inflict such penalties as giving them a job they didn't like to do for a couple of days or a week, or laying them off. Not a financial penalty to be paid to us, but demoting them for two weeks or a month. Then we also tried to reward them for careful driving, but we could not change the total number of accidents.

"This reward idea is interesting. For a good month without accidents we awarded $1 to each driver, $2 for the next month and so on. But we soon found out that the only thing we were doing was to pay the good drivers more money, whereas it had no effect on the poor drivers at all.

"Having tried educational methods, penalties and rewards, and found them all wanting, we next tried to find something in the men that would account for their accident prone condition. We took five of them to the department of psychology of a nearby university for mental examination. Four out of the five had averaged four major accidents a year.

"The tests made at the university showed that they were definitely feeble minded and had the intelligence of an eight year old boy. The fifth man had intelligence but he had trouble with his vision which could not be corrected by glasses. After these findings we had openings for five more men. And it was the only sound basis by which we were able to effect that accident rate. Thus we got rid of those who contributed fifty per cent of the accidents year after year. We replaced these accident prone men with drivers who met the test and then transferred accident prone drivers to other types of work.

"This again proved a mistake. That didn't pay either. We found that men prone to have accidents on the road should not be transferred elsewhere because his proneness carried right over into personal injury. We found he substituted personal injury accidents in lieu of traffic accidents. In fact, one of the men driving his own car was involved in an accident later that cost two lives. Another met with accidental death in his own machine.

"What happens to men when transferred from traffic to non-driving jobs? They have accidents just the same. It is not the fault of the individual really, but something he cannot control. The thing that causes it is an unconscious thing. He is not morally responsible. Nor can he be cured. The only thing that will cure the accident rate in the warehouse or on the road is the elimination of the man who is accident prone. You cannot place the blame on him—it is not a moral thing at all. The man is not to blame for something he cannot help.

"The intelligence test used by the university takes about thirty minutes. It is frequently called the Morgan test. It asks simple questions. And the answers to what appear to be very simple questions are amazing. For instance, 'the sun rises in the _____ and sets in the _____.' These accident prone drivers answered that question any number of ways. It showed them to be boys of low mentality. It was the greatest shock of our lives when we checked into their relatively low grade mentality. Yet we tested them in our own way in casual conversation and couldn't detect anything wrong with them. Certainly there was nothing wrong with their appearance. You could not tell by looking at them or talking with them. They were nicely dressed and looked bright enough. Their conversation was normal and apparently intelligent.

"Since we made this shift as a result of this test, we have reduced our accidents 43 per cent in the first six months."

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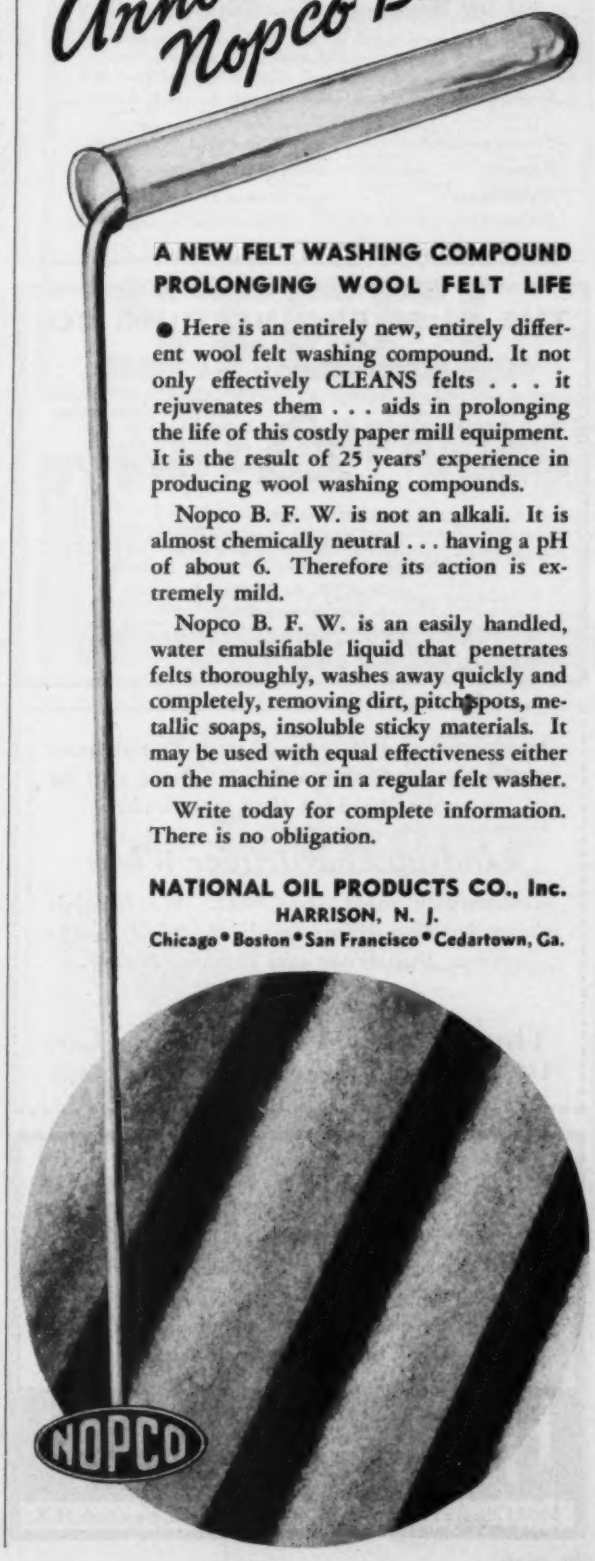

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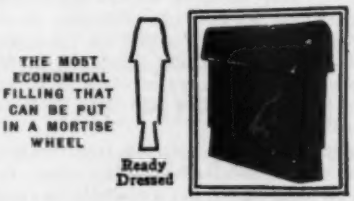

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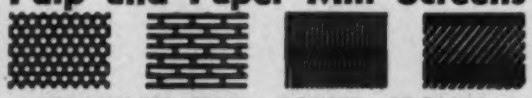

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Stage is Set for Supers' Convention

WITH the opening date of the Eighteenth Annual Convention of the American Pulp and Paper Mill Superintendents' Association rapidly drawing near, seventy-two exhibitors have secured space at the Paper Progress Exposition. This exposition will be a highlight of the three-day convention opening June 23 at Springfield, Mass. The committee headed by General Chairman W. Gordon Booth has announced that it entertains no fears as to hotel accommodations, but companies who have not yet made arrangements for floor space at the exposition should wire if they intend to do so. Reservation requests for both exposition space and hotel accommodations will be handled by Adrian L. Potter, secretary, convention division, Chamber of Commerce, Springfield, Mass.

On Thursday, June 24, National President Frank J. Timmerman will call the general meeting to order and deliver his annual address. Following routine proceedings, there will be a general discussion of mill problems, and beginning at 2:30 p. m., Thursday, a series of group meetings will be held.

Book and Fine Paper Group

Past President Charles Champion, who will serve as chairman of the book and fine paper meeting, has announced the following program for this session:

"Description of the Jones-Bertram Patent Beaters," by George H. Spencer of the E. D. Jones & Son Company.

"Evolution of Sized Paper Drying," by Frank W. Partsch of the J. O. Ross Engineering Corporation.

"Clean Papers," by F. K. Becker of the Bird Machine Company.

Ground Wood Group

C. D. DeMer, of the Taylor Instrument Companies and R. I. Wynne Roberts of the Norton Company will be two speakers at the ground wood meeting, according to an announcement made recently by Sidney D. Wells, the chairman of this group. Mr. DeMer will present a paper on "Paper and Pulp Grinder Temperature Control" and Mr. Roberts will discuss recent work in the application of artificial pulp stones to the grinding of wood pulp. Mr. Wells also expects to have the meeting addressed by two or more ground wood pulp superintendents who will present problems from the operating side.

Soda-Sulphate Group

John McCrystle, superintendent of the soda-sulphate mill of the Brown Corporation, La Tuque, Quebec, will be the chairman of the soda-sulphate group. Mr. McCrystle is arranging a program of direct interest to makers of these two grades of pulp.

Sulphite Group

An interesting program is being arranged by Morris W. Hedden, chairman of the sulphite group.

Board Group

Five papers will be presented by well-known authorities to the board group meeting, according to John H. Brougham, general superintendent of the Penn Fibreboard Corporation and chairman of this session. The papers to be presented are:

"Making Board from the Stock Pile to the Finishing Room" by Allan Hyer, of the Black Clawson Company, and John A. Haemme, of the Shartle Brothers Machine Company.

"Steam for the Board Mill" by S. M. Marshall, of H. M. Wilson and Company.

"The Sven Pederson Flotation Save-All" by F. Myer of Stockholm, Sweden.

"Improvements Incorporated in the Latest and Largest Fourdrinier Liner Board Machine" by R. S. Johnston, general sales manager of the Pusey and Jones Company. Motion pictures will accompany Mr. Johnston's talk.

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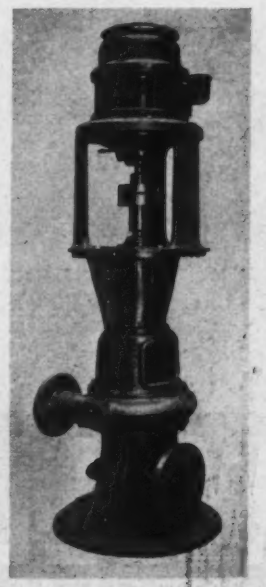

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FIG. 1460
MASTER PILOT GATE VALVE

FIG. 1444
MODEL STAR
GATE VALVE

FIG. 199
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By W. S. JOULE

◆ Keep Belting in Good Condition

In some plants a systematic effort is made to keep belts pliable and in good running condition. But in many places, a new belt is put on, and forgotten. Often belts are run in hot places. Without proper attention, a belt soon becomes dry and hard, cracks in numerous places, and fails to deliver the power applied to it. In a certain plant, ground rosin is the only treatment applied to belts. When a belt squeaks and slips, a handful of rosin is sprinkled on the belt face, which stops slippage for a few days. One can imagine the condition of belts in this plant—dry, cracked, and with the inner surface pulled off on many drives.

Belting should be maintained as any other piece of equipment. The occasional application of neatsfoot oil applied with a brush will keep them pliable and in good condition.

◆ Pipe Insulation Is Important

Steam pipes must be insulated to prevent the flow of heat from the outside of the pipe to the surrounding air. There is no advantage in furnishing dry steam at the boiler if bare or improperly covered pipes deliver steam at the point where it is to be used at a great loss in temperature or in a wet condition. The fact of the matter is that each B.t.u. lost by radiation from a steam pipe represents about 1.4 B.t.u. which must be supplied from the coal pile, this being based upon a boiler efficiency of about 90 per cent.

Flow of heat from the liquid in a bare or insulated pipe to the outside surrounding air is measured by the number of heat units (B.t.u.) that flow through the walls of the pipe, or insulation, or both, and it is usually expressed in the number of B.t.u. that flow through an area of one square foot in one hour. This is the basis of most radiation curves and tables.

Rate of flow through a certain thickness and at a certain difference in temperature determines the conductivity of the material through which the heat flows. A smaller number of heat units flow through a material with low conductivity than one with high conductivity. The relative efficiencies of various insulating materials may be appreciated by comparing their conductivities under similar conditions. A material which would offer no resistance to the flow of heat may be said to have an insulation efficiency of zero and an insulation that would allow no flow of heat through it would be 100 per cent efficient.

Efficiency of an insulating material is expressed by a percentage which is the per cent saving which would be effected by insulating a pipe with that material over what would be lost if the pipe were left bare or uninsulated. The efficiency per cent is obtained by subtracting the heat loss of the insulated pipe from the heat loss of the uninsulated or bare pipe and dividing the difference by the heat loss from the bare pipe.

◆ Small Hoists for the Power Plant

Maintenance work around a power plant requires that many heavy pieces of machinery be handled. This is work which must often be done with as much dispatch as possible and by the ordinary plant crew. Hand methods of handling heavy parts are always slow and tedious, particularly in view of the fact that the available help around a power plant is generally restricted to the operating crew. Maintenance work, then, must be considered as extra work to be performed by the regular crew and in such a manner that service will not be interfered with.

It is this condition which has brought about the extensive use of hoists and cranes to perform not only the routine work but to expedite the emergency work about the power plant.

Aside from the ordinary arrangements of rope and pulley tackle, which in maintenance work have many disadvantages, the most common form of hoist is that known as the chain block. It has the advantages that it is portable, cheap, rugged and it automatically holds its load suspended.

Three types of chain blocks are in common use; these are the differential, screw geared and the spur geared.

◆ Utilizing Radiant Heat

One of the big problems in furnace design has been to proportion the walls and arrange the heating surfaces so as to maintain a temperature which will insure complete combustion yet will not melt down the furnace lining or cause clinkers. When anthracite and low volatile eastern coals were the common fuels in power plants, combustion space requirements were moderate and the boiler was placed down near the fuel bed or, as in the case of internally fired boilers, the heating surface completely surrounded the burning fuel. This kept the furnace temperature low but such an arrangement also keeps down the possible rate of combustion so that with high volatile coals combustion of the gases is incomplete.

Where high rates of combustion are employed, the tendency now is to build large furnaces and keep the temperature down by exposing more heating surface to the radiant heat of the furnace. This may be accomplished by rearranging the boiler baffling, providing water backs for the front of the bridge wall, supplying water screens to prevent fusion of ash in powdered fuel furnaces and by lining one or more of the furnace walls with steam superheating surface.

◆ Pumps Need Periodic Inspection

Steam pumps about the plant are often the cause of losses. Reciprocating pumps are great steam eaters, taking steam practically the entire stroke. It is no uncommon occurrence to find these pumps operating for years with the interior of the steam end never seeing the light of day. Good practice calls for periodic inspection of the steam cylinder. By this means, leaky piston rings and grooved and cut cylinders can be detected. The water end is allowed to run until the pump fails to deliver the necessary amount of water. It is far more economical, and better service results when pumps are kept properly packed.

Another point is that the movable parts should be oiled occasionally. A pump is no camel in this respect, and a little oil applied to arms and levers greatly prolongs the usefulness of these members. In passing, it may be noted that there is no valid reason why steam and water should be squirting from stuffing boxes. A little attention will stop these unnecessary leaks and improve the looks of things considerably.

◆ WEEKLY TESTS of steam-turbine governors and emergency trips should be made in all plants to guarantee their proper operation when needed. The emergency trip can usually be tested either by directly releasing the latch, or better still, by operating the governor with a small lever and overspeeding the turbine until the latch trips automatically. Of course, for this test the turbine must not be on load in parallel with another machine.

Continuous and Automatic Beating with the THORSEN-HÉRY BEATER

Successful results during nine months' actual mill operation have proved the Thorsen-Hery Beater to set a new standard of beater performance, warranting the installation of six additional Beaters for continuous and automatic beating. The seven beaters will handle 200 tons of Southern Kraft per day, and when combined with three Jordans will develop 125% Mullen strength, and reduce the freeness from 700 C. C. to 300 C. C.—requiring a total of only 1892 H. P.

Such results are due to the mechanical efficiency of the Thorsen-Hery Beater; elimination of circulation losses, and controlled operating conditions.

Ninety per cent of the input energy to the Beaters is consumed by the stock being treated. The amount of treatment is not limited by the roll weight and the proportion of stock pick-up to bar and bedplate area is carefully designed so that no excess stock is moved by the roll. Maximum working pressure on the stock, as it passes between roll and plate, can be applied up to the capacity of connected power.

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TECHNICAL DEVELOPMENTS

The following abstracts are of the latest developments found in the foreign press.

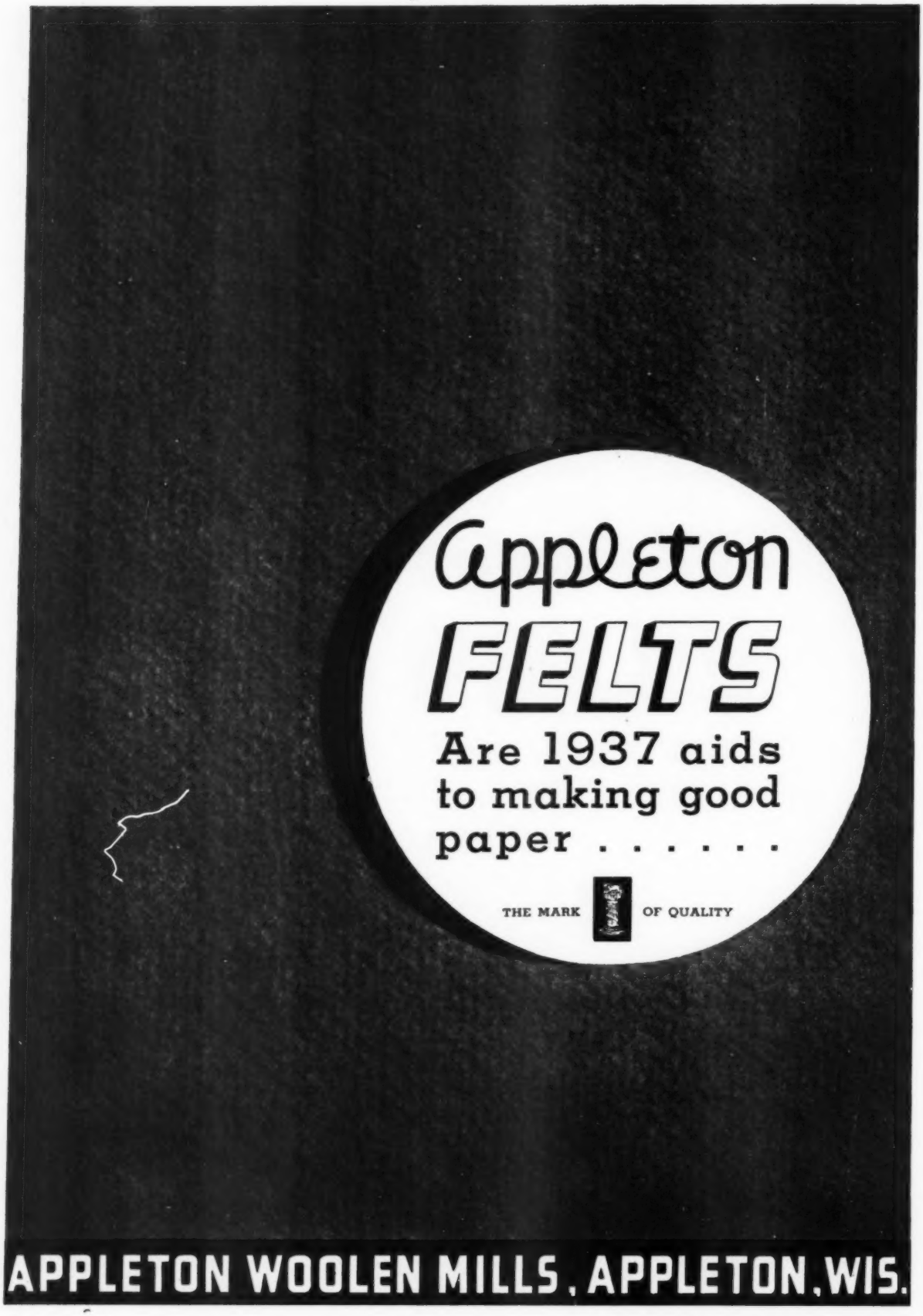
IN THE PAPER INDUSTRY

◆ The Fourdrinier Wire

These are two further articles by a British research chemist and metallurgist. (For the abstracts of the first portions, cf. THE PAPER INDUSTRY, 19, No. 2, 227.) The most important factor in wire destruction is abrasion. Corrosion and fatigue play minor roles. Experiments showed that 60-70 per cent of the abrasion takes place at the edges of suction boxes, where there is a marked pressure between the wire and the wood or the metal of the edge, and between which are lodged sharp particles of silica or china clay from the pulp. This is especially true when these become imbedded in the wood. Whenever the suction pressure is increased to overcome the speed of the machine, or the weight of the sheet, the wear of the wire is increased. In practice this has been demonstrated in the case of newsprint.

In the U.S.A., where very little filler is used, the wires last about twice as long as they do in England, with the machines running at approximately the same speeds. A new wire establishes contact and transfers its load only through the points of the warp knuckles. As the intensity of the load is very high, the initial wear is very great. When the area between the machine and the wire increases, the rate of abrasion falls off. If a vertical section is cut in the longitudinal direction of the warp, and through its center, the wear on the knuckles is clearly shown. This is demonstrated in Figure 1. When the section is cut through an average knuckle, the direction in which the wire cloth has been run can be gauged by the lap rubbed over at the rear end of the flat. This shows the tearing action on the surface of the alloy. The high pressure hardens the surface layers of the metal. The crystals within this are elongated in the direction in which the cloth is run, and broken up much as when the metal is drawn. As the metal decreases in thickness, the warp between the knuckles exceeds its original strength, and the bending action takes place in the reduced section of the knuckles. The hardened metal, with its furrowed surface, is not suited to bending, the severest forms of which are not at the breast, couch, or even the stretch rolls, but again at the suction box edges, which really behave like very small diameter rolls. The contours of the suction-box strips are of importance as a corrective. So is the substitution of suitable metal in the place of wood. Contacts between wire and edge may be regarded as bearings. After a small point has been worn off during intense loading, the load per unit area will be sufficiently small and the area of contact sufficiently large so that water furnishes almost perfect lubrication. Thereafter the abrasion is relatively slow. This theory of wear gains support from the fact that when the weave of the wire is so altered that it gives a larger bearing surface (with the same weight of the metal), the life of the wire increases proportionately to the area of this surface. The recently improved so-called twill weave increases the life of the cloth by increasing the surface area of the original contact, without sacrifice to the quality of the paper. Other weaving modifications have not been a success. The twilled weave has other advantages. The less-pointed face knuckle and the shallower trough permits the sheet to contact a comparatively flat surface. Early trials with twill were unsuccessful due to deep troughs in which the fibers were trapped, and from which the sheet could be removed only with difficulty. This has been obviated by recent improvements. In a given area of the same mesh wire, the number of contact points between wire and paper have been reduced from 27 (for plain) to 17 (for twill). Simultaneously, the wearing knuckle contact of this same surface area was changed from 37 to 27. The potential area of metal available for transmission of the weight of the cloth to the machine is increased by the triple weave. The 90-mesh wire first used in cigarette paper manufacture has been supplanted. Three fine wires are treated as a single warp wire of 60 mesh, and appear in the cloth very close together, separated by the drainage area from the next warp of 3 wires. This tends towards a marked increase in pliability. The flat wire for the warp is the latest innovation in the twilled weave. This permits the maximum resistance to wear, and pliability is again increased. Thus the cloth settles on the machine at an increased rate, and when wear begins, the usual marked difference in strength between the face and wearing side of the wire is greatly lessened. Vertical thickness of the warp is correlated with the reluctance of the cloth to bend, which remains approximately constant during the life of the wire. In other wires, this resistance on the wearing side usually decreases to about one-half of that on the face side. However, with the lower vertical thickness of the flat wire, this disparity is much less. Furthermore the small point supports are replaced by flat areas and the wire mark is much less. Seaming is one of the most troublesome phases of cloth-making, and the stitched seam cannot resist the severity of some of the modern running conditions (although it is usually satisfactory for low and medium speeds).

Even the use of a superlative grade of wire has not solved the stitching problem. As greater suction draws the wire further and further into the boxes the seam is subjected to sharper bends with a resultant whipping and distortion. Top couch rolls may give trouble with stitched seams, with a tendency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towards nipping. Although modified stitching methods which preclude free hinging of the seam result in less projection, they also cause stiffening of the entire area around the seam, with subsequent wear of the cloth at these points. It is difficult to weave a cloth when its length and breadth are perfectly flat, for such weaving leaves a high residual stress, shown, for example, by heating a piece of cloth to 400-500 deg. C., thus causing the formation of waves and creases as differing stresses are released.

To make the cloth uniform, a finishing operation is resorted to which stretches the cloth between large diameter rollers, and which reduces the stress effects concentrated in any area and aids in causing the warp knuckle to imbed itself in the weft. The author, however, shows the necessity of controlling such stretching operations, which, when they exceed a certain point may reduce the pliability. Overstretched cloth is narrower and longer as the increased knuckling of the weft decreases its length and causes upward curling of the edges. Evenness of stitch is emphasized and the hazards resulting from unevenness are discussed. This may be caused by cutting the warp ends at each edge too long, prior to stitching. In general, these ends project upwards, and the wire of the stitches resting on them, are either worn off on top by friction or worn into a notch from below. The section of the photomicrograph in Figure 2, is taken vertically through the warps, showing in cross section the weft wire on either side. The stitches are at an angle to the warps. If, for a considerable period, the wire on the machine runs in exactly the same position, grooves form on the suction box by the warps, and ridges ensue between them. These hold silica particles which wear deep grooves in turn into the warps as shown in Figure 3. In present practice, warps do not run perfectly parallel throughout the cloth, and this marked grooving is avoided. The following summarizes the advantages of the welded seam: (1) continuity of properties by joining warp to warp; (2) maintaining drainage areas (which are decreased by stitching); (3) greater strength; (d) absence of flapping (noted in stitched seams). A soldered seam offers similar advantages, but it entails the use of a second alloy, thus introducing a new factor.

The former complaints that long narrow spaces exist in the twilled weave have not been heard with regard to welded seams, in which no weft is present to break up suction pressure. Both electrical and acetylene welding methods are in use, and the difficulties are discussed in either case. A recent patent claims that the energy liberated in the arc, and the heat applied to each junction is controlled by the discharge of a condenser circuit, of variable capacity, thus suiting the mesh and the weave. The arc is formed only when the circuit is broken by the removal of the needle, and permits the welder to place this needle accurately before the actual welding takes place. A fault of the electrically welded seam is oxidation, and here acetylene has the advantage, for the weld is clean and free of oxide.

Theoretically, the best welding would probably be a non-arc resistance method. The amount of current passing through the metal determines its temperature, and pressure could then be applied to both the warp ends, giving fusion without initial liquifaction. A recent method limits the time of current passage to very short periods (say 0.004 second). However, a great amount of individual experimental work would be required to determine the magnitude and the necessary conditions of leading in the current. Welding without pressure presupposes a temperature that will cause the wires to fuse without showing their original boundaries. The metal is never completely liquid. After cooling, however, it has the structure of a cast metal, thus destroying the original benefits obtained from working and annealing the wire bar-ingot. Its strength is probably as great as that of the annealed alloy, but its ductility is much lower. Making good welds seems to depend not so much on reducing the total damage to the cloth as on the area in which this damage occurs (especially when there are metallurgical changes in structure), and in the original positions of the two edges of the cloth prior to welding. There are two possibilities: (a) to keep the welding effect so localized that only the metal of the so-called dot develops a cast structure, and to avoid an overheated annealed structure—these conditions being best obtained with resistance welding; and (b) to introduce heat in such a way that all structural changes result very gradually without sectional planes of weakness. The second is the other extreme from (a). H. H. Parrett. Paper Maker and British Paper Trade J. 93 (T.S.) 33-4; 50-54 (1937).

◆ Water Repellents Applied to Paper

This is a practical study with the object of making kraft paper impermeable to air and water, and to utilize such papers in making sacks, capable of transporting artificial fertilizers. The paper used was unsized kraft, weight 88 g. per sq. meter. (Papers of somewhat lower weight were also tested.) The paper after treatment with a specific repellent was then submitted to the following tests: (a) penetrability of water (in the Herzberg apparatus), (b) porosity (Schopper densometer), (c) weight per sq. meter, (d) tensile strength in kilos, (e) stretch, (f) tear resistance. Treatment with aluminum acetate resulted in fairly high impenetrability to water, but a high penetrability to air. Calcium resinate rendered the paper quite waterproof but penetrable to air. With zinc chloride, the water pentration (under the conditions of the laboratory test) took 2¼ hours, and the air penetration was 10 cc. (time period not stated). Furthermore, the tensile strength increased from 7.06 kg. to 9.3 kg. However, the double folds decreased from 2530 to 1660. The process is quite expensive and has not been tried on a large scale. Applications of cumarone resins proved unsatisfactory. Aluminum naphthalate does not render the paper air-proof. Paraffin-oil-rosin mixtures were also unsuitable. Although no mill runs were made with pectin-glue (15 per cent in aqueous solution) the laboratory tests were very satisfactory. With this repellent, water penetrated only after 4 hours and 35 minutes, and the air penetration was 0.57 cc. The most extensive practical experiments were made with bitumen, which was found to be a very satisfactory repellent, and which was applied with 50 per cent mineral oil. The best method of impregnation was found to be at a speed of 63 meters per min., with the solution applied to both sides of the paper sheet. As regards mechanical properties, the usual technical requirements were met only by cable papers. Very good results were obtained with unsized paper, weight 70 g. per sq. meter. Treated paper sacks filled with 40-50 kg. sand were dropped from a height of 1 meter. In this test the 70 g/m paper withstood 20 such drops, while the cable paper sacks lasted up to 50. Sacks with sewn bottoms were unsatisfactory, but glued sacks lasted well irrespective of the type of glue used. In actual transportation tests over distances of 4000 kilometers, and under varying climatic conditions, only 0.2 per cent of the bitumen treated bags were damaged. This marks a great improvement over sacks impregnated in other ways. W. A. Grabowsky, Materials of the Institute, U.S.S.R., through Zellstoff u Papier, Oct. 1936, and Paper-Maker and British Paper Trade J. (T.S.) 92, 178-9 (Dec. 1936).

◆ Sulphite Process Applied to Straw

This is the summary of a thesis presented at the School of Papermaking at Grenoble, and forms the basis of French Patent No. 792,238. Digestion of straw with sulphurous acid, sodium bisulphite, and calcium bisulphite, alone or after pretreatment with alkali or hydrofluoric acid, yields straw pulp, which no longer responds to the phloroglucin reaction. No matter what treatment is used these pulps are very faintly yellow, but this coloration reaches a minimum after digestion with calcium bisulphite, under carefully controlled conditions (details of which are presumably given in the original thesis but omitted in the abstract). Unbleach straw pulps may be used in a variety of colored papers and these same pulps, when treated with bleach in slight excess give a good grade of white pulp, although even this shows a slight amount of the yellow elements under the miscroscope. For industrial purposes the bleach may be decreased by pretreatment with 1.4 per cent NaOH based on the weight of the crude pulp. This figure is actually less than the losses incurred (in NaOH) under the optimum conditions for soda recovery after soda or sulphate cooks. When this pretreatment is used, about 4 per cent active chlorine (12 per cent bleaching

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1. Capacity—This machine has much greater capacity than any standard design of Hollander. Two cases in point: One unit is treating 80 tons of sulphite stock per day in a bond mill; another unit is handling 60 tons of bleached sulphite daily in a tissue and specialty mill.

2. Floor Space—Only a fraction of that occupied by an ordinary beater.

3. Power Saving — The above mentioned units use 75 h.p. and 85 h.p. respectively.

4. Simplicity of Design—Consists of 10 rotors on a vertical shaft operating opposite 10 stationary sections—all within a simple housing.

5. Uniformity of Stock Treatment—If stock is furnished the machine at a constant density, the work on the fiber will be uniform until adjustment is changed by operator.

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powder) is required to reach a 45 per cent yield of sulphite pulp which compares favorably with the 40 per cent average pulp yield, obtained in soda or sulphite digestions. The advantages of the bisulphite cook in regions where straw is a relatively cheap raw material is stressed. Up to 50 per cent of the straw sulphite pulp can be admixed with spruce sulphite in a variety of papers. There are parts of the country (presumably in France) where the sulphite straw pulp may be manufactured at a cost about 20 per cent lower than sulphite from wood. Moniteur de la Papeterie Francaise, 73, No. 24,579 (1936).

◆ Conductivity Measurements on Paper Extracts

Certain condenser papers have low insulating power despite very high resistance to electrical breakdown. The relation between this property and several other properties of the paper, notably air permeability and conductivity of the paper extracts, were investigated. No relation was found between the air permeability and the insulating properties. Papers with low insulating power, however, yielded aqueous extracts with high conductivity, thus indicating that the trouble was due to high content of water soluble electrolytes. The conductivity measurements were made using a Wheatstone Bridge setup, and two methods of determining the null point are described. The aqueous extracts were prepared by heating 3 grams of the paper sample with 150 cc. of water for one hour in a water bath, cooling, and filtering. The specific conductivities were measured at 18 deg. C. and averaged about 0.00005. Further experiments to determine best method of preparing the paper extracts, optimum concentration, etc., are in progress. Lambert & Schulze, Papierfabr. 35, (Tech. Teil) 67-70 (1937).

◆ Microscopic Studies on Sulphite and Soda Pulps

While the title of the original paper implies that studies were made on unbleached, half-bleached and bleached pulps, the summarized data, with only a few exceptions seem to deal with unbleached pulps. These were examined by carefully determining the lignin content and by the use of the Lofton-Merritt, the Bright Standard method (and several modifications of the Bright method), the Malachite green method of Klemm, the Malachite green-Congo-red method of Behrens, by noting the primary fluorescence, and then the secondary fluorescence after staining with Rhodamine 6gd extra. The methods used in making up solutions are given in the most complete detail. Furthermore the technique of preparing dyed test sheets for microscopic examination is described. The degree of whiteness of the uncolored pulp was determined by using a Zeiss Stufenphotometer. In the sulphite pulps the lignin content varied from 0.47 in a half-bleached pulp up to 7.65 in a very

Steel Tanks and Platework for the PAPER INDUSTRY

AT CROSSETT

The accompanying pictures show several of the twenty-odd tanks built for the new Crossett Paper Mills at Crossett, Ark. The 100,000-gal. elevated tank above provides gravity water pressure for fire protection. At the left can be seen two weak wash tanks.

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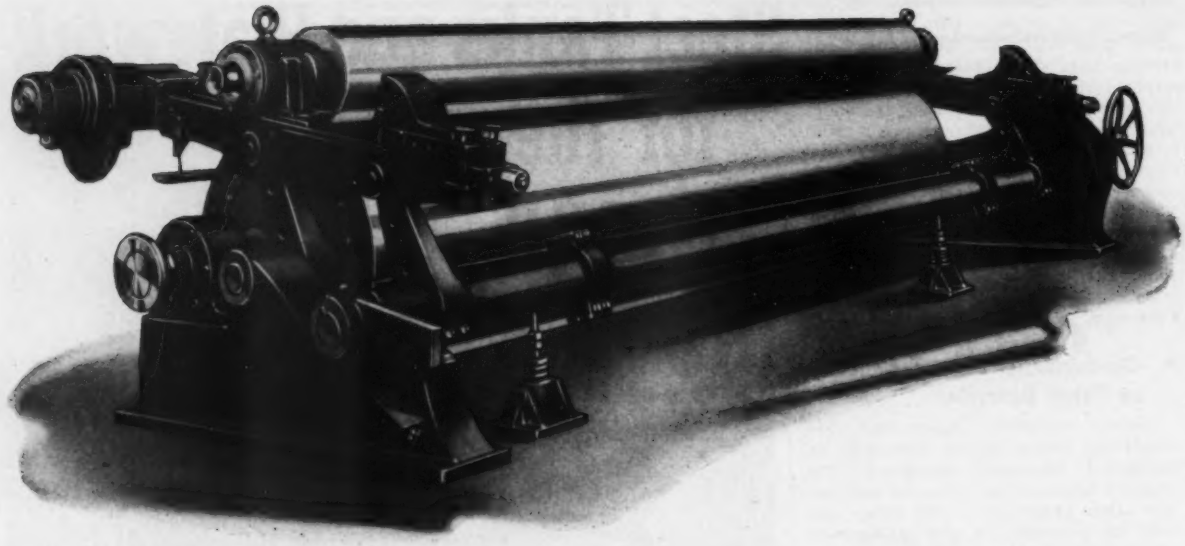

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THE DESIGN OF THE modern BAGLEY & SEWALL Automatic Reel provides for the maximum efficiency in handling paper from the lightest to the heaviest weights suitable for this type of reel. Originally designed for handling light weight tissues at speeds from 800 to 900 feet per minute, for which condition it proved highly satisfactory, it is also giving very satisfactory results on medium to heavier weights. Without exception, all operators using this reel are enthusiastic about its operation, maintaining that it is the most convenient reel that they have ever handled. Each empty reel drum is held in bearings located nearest the calendar stack and as the roll builds up the supporting bearings automatically move away from the original position, so that the next empty drum may be placed in the initial starting place.

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UNIFORMITY and trueness of running reel drum.

UNIFORMITY of tension throughout the winding action.

CONTROL of the degree of tension.

CONVENIENT means for placing empty reel drum in readiness for changing the sheet from the completed roll to the empty drum.

INSTANTANEOUS shift of the sheet from the completed roll to the empty drum, with no loss of paper, and with smooth winding from the start.

EASY removal of the finished roll, without interference with the starting roll.

EFFECTIVE and dependable spreader.

NICELY balanced, hand operated doctor.

THE reel occupies much less floor space than other forms of uniform speed reels.

THIS reel is now being used in a number of installations, including both narrow and wide machines and on papers running in weights from 8½ pound tissue to heavy book, at speeds limited only by the maximum speeds of the paper machines.

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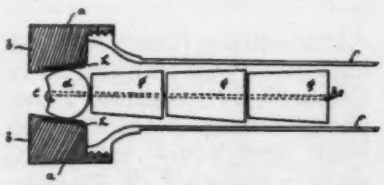
hard, unbleached pulp (In many of these, the Roschier numbers are also given). By all the common microscopic staining methods, no satisfactory correlation was obtained between the actual lignin content and intensity of stain, excepting in the case of the Lofton-Merritt method, which gives a simple means of measuring the degree of pulping. Fluorescence could not be easily correlated with the degree of hardness. When microscopic methods are feasible, both the Lofton-Merritt dye and the Malachite green method indicate the lignin gradations in the various sulphite pulps. In the case of unbleached soda pulps none of the microscopic staining methods was entirely satisfactory. When the pulps ranged from 6-6.5 per cent lignin, even the Lofton-Merritt stain failed in the differentiation. When pulp sheets can be made, however, both the Klemm and the Lofton-Merritt dyes can be correlated with lignin content which (in soda pulps) varied from 0.42 to 6.54 per cent. Bruno Schulze. Papier-Fabr. 35 (Tech Teil) 25-9; 37-9 (1937); Wochbl Papierfabr. 67 (Tech Teil) 856; 68, 7-9 (1937).

◆ Spray Pipe for Paper and Board Machines

The cut shows, in cross section, one end of the spray-pipe (f), containing a device which the patent claims can be more readily and thoroughly cleaned than by means of other devices. A threaded cap (a) is bored conically, and within this (arranged and seated on rubber-lined walls (h)) is the ball-valve (d) to which are attached a number of corks (g) by the wire (e). The cleaning of (f) is effected by using a long rod that is inserted into the opening (c), by means of which (d) and the series of corks (g) are pushed to the other end of the pipe. This movement forces the corks over the spray bore-holes, loosening the dirt, which is drained off by means of water. When the rod is withdrawn, the water pressure in (f) pushes (d) and (g) back to their original positions, and (d) prevents any further drainage of the water at the (b) end of (f). Willy Hahn. Germant Patent No. 634,352, KC 55d.



◆ Torsional Vibrations on the Paper Machine

The difficulties that may be encountered when steam drives are used in the paper mill are discussed. The treatment of the article is largely mathematical and also includes a number of recent references to the literature. Georg Süss. Wochbl. Papierfabr. (Sondernummer) 1936, 37-45.

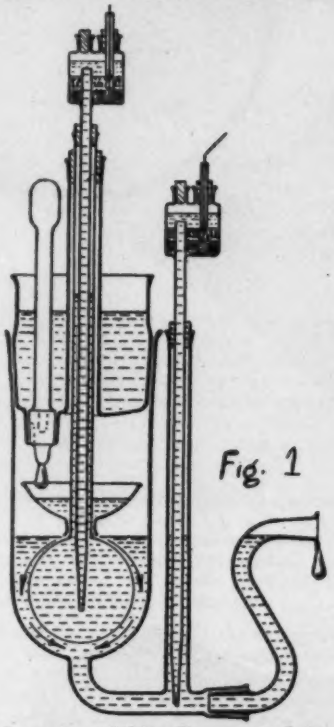
◆ Bamboo Pulp for Rayon

Dilute NaOH at 100 deg. removes the pectins of bamboo, which is subsequently washed with cold and hot water and then heated in an autoclave with a suitable mixture of NaOH, Na_2S, together with small amounts of Na_2SO_3. Guaiacol may also be introduced since it serves to remove bamboo lignin and thus permits the use of old bamboo in pulping. (The abstract does not state at what stage of the cook guaiacol is added.) If no guaiacol was used, the pulp is washed with hot water after the digestion. Otherwise benzol is used to emulsify the phenol. Finally the product is bleached with hypochlorite, washed and then treated with hydrofluoric acid to eliminate residual silicates. The bamboo pulp contains 96-98 per cent alpha cellulose, less than 0.3 per cent lignin and 0.07 per cent resins. Its copper number ranges from 0.6 to 1.5, and the average fiber length is 8 mm. J. Sala. Rusta (Sept., 1936) No. 9,517; through Papeterie 59, No. 3.129 (1937).

◆ pH Measurements in the Pulp and Paper Industry

This is a collective article which takes up successively hydrogen-ion measurements by colorimetric, by catalytic and by potentiometric means. The latter receives most attention, and the various forms of electrodes (calomel, hydrogen, quinhydrone, antimony, the glass electrodes of Kerridge and MacInness and finally the new glass electrode devised by the author himself), are discussed in detail. Supplementary illustrations are given. When glass membrane electrodes are used, the composition of the glass is important, and a glass containing 72 per cent silica, 6 per cent calcium oxide, and 22 per cent sodium oxide seems to be well adapted to most purposes. The Schwabe electrode (fully described in Zeitschrift Elektrochem. 41,681 (1935) and 42,147 (1936) has the following arrangement: $Hg/Hg_2C1_2.KC1$ satd/ solution with unknown pH/Glass/solution of definite pH/saturated $KC1.Hg_2C1_2$/ Hg. Ordinarily the usual sensitive galvanometer cannot be used in potentiometric measurements involving the glass electrode. Either a quadrant electrometer or the more recently devised (vacuum?) tube voltmeter is employed. However the author has found that if the glass membranes are made thin enough, galvanometers with sensitivities of 10^{-9} or 10^{-10} amperes are satisfactory.

When the Pogendorff connection is used, good results can even be obtained with galvanometers reading to 10^{-8} amperes. The great advantage claimed for the Schwabe electrode in the pulp and paper industry is that it is insensitive to oxidizing and reducing solutions. For example, it gives accurate measurements in the case of sulphurous acid, hydrosulphites, nitric acid, hydrogen peroxide, chlorine, hypochlorites, etc. Heavy metals do not cause potentiometric disturbances. Only strong alkaline solutions, of pH 10 or above give trouble since they attack the type of glass described. However, according to Sokoloff and Passynsky (Zts. phys. Chem. A 160,366 (1932) when the glass contains about 10 per cent lithium oxide, 10 per cent calcium oxide and 80 per cent silica, solutions with an intensity of acidity of about pH 13 may be measured. The technique of using the Schwabe electrode is carefully described. When there is an inner pH in the known solution of 3, the potentials vary from plus 174 to minus 638 M.V. at 20 deg. C. The glass electrode was used in measuring untreated water, boiler feed water, cooking and waste sulphite liquors, and is of special value in examining bleaching solutions, which attack the dyes of the colorimetric indicators, and which play havoc with all other types of electrodes thus rendering them useless. The value of the glass electrode in determining the pH of sizing solutions, dye solutions, and in the examination of waste liquors that have been clarified, is pointed out. By and large (in the author's opinion) the use of thin-walled glass membrane electrodes is the only technique that lends itself satisfactorily to practically every pulp and paper mill operation in which it is essential to know the pH as a control. Figure 1 shows the construction of the Schwabe electrode. The article is very well illustrated with 11 cuts and gives 39 references to the recent literature. Kurt Schwabe, Wochbl. Papierfabr. (Sondernummer 1936) 24-36.



◆ Discoloration of Pulp by Light and Heat

The discolorations were measured by means of Hilger's blancometer (Cf. Proceedings of the Technical Sect. of the (British) Paper Makers' Association, 1933, 13,359). Photoelectric means were

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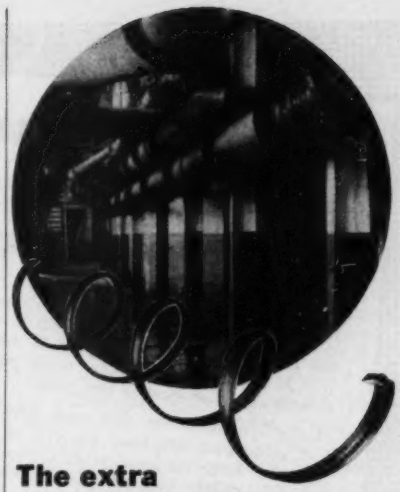
used in comparing the sample with a clean surface of magnesium oxide, and the movement of a standard wedge required to bring the intensity of the light reflected from that surface to that given off by each pulp sheet, was measured. This technique was used under white light, as well as under the light passing through three separate filters which between them covered the visible portion of the spectrum, and which is arbitrarily termed red, green and blue light.

When the values obtained by the use of these filters are plotted graphically (and unfortunately no graphs are included in the original article), the abscissae of the graphs show the reflectivity in per cent. The ordinates show the points marking the positions of the white, red, green, and blue. The 100 per cent standard white reflectivity would be indicated by a line drawn at the top of the graph, while complete blackness (i.e., zero reflectivity) would be a line at the bottom of the graph parallel to that at the top. Varying shades of whiteness, grayness, or blackness, would be represented by intermediate lines parallel to these. In other words, a line near the top of the graph would represent whiteness, and as the lines approached the bottom, they would represent grayer and grayer tones in the pulp sample. A deviation from such parallel lines would represent colors, neither white nor gray, and this deviation is termed the color factor. In all of this work (which is presented in a mass of data) the percentage of light reflected in white, red, green and blue is given together with the so-called mean tone (computed by averaging the reflectivity data obtained when the three light filters were successively used), and also the color factor for each pulp sample examined. The sheets were exposed to sunlight in frames ordinarily under Vita glass. Humidity and temperature conditions were noted and the number of hours of sunlight functioning during exposure was estimated.

As controls, the reflectivities of samples that had not been exposed were also recorded. After preliminary experiments were made by exposing the sample for 36 hours to sunlight, and making blancometric readings every two hours, it was found expedient to standardize exposure to sunlight as follows in the case of all pulp sheets: 3 hours, 4 weeks (May-June); 4 weeks (June-July). These experiments were carried out in Scotland. The same pulp sheets were also exposed as Cairo to sunlight (and by means of a protective device) to heat alone (this heat being the same as that accompanying the sunlight exposure). Furthermore the samples were exposed for 4 hours to ultraviolet light and for 2 and 8 hours respectively to the light of an arc lamp. They were also kept under thermostatic control at 30 deg. C. at 90 deg. relative humidity, during 4, 6 and 12-week periods. The authors have given their results in a series of detailed tabulations, which are briefly summarized in the table included in this abstract. Here the so-called fading factors are collected and the results of fluorescence tests are included. In the case of the latter the sample was exposed for a short period to sunlight (in Buckinghamshire), and the fluorescence change in screened ultraviolet light from a Hanovia lamp permitted estimation of the degree of fading (as compared with the original sample). The term (A) means a very slight change, (B) a slight change, (D) a definite change, and (F) a sharp change. The fading factors were calculated by the numerical addition of the loss (or gain) in the mean tone, and the gain (or loss) in the color factor (over those obtained in the case of the original unexposed sheet). A fading factor having a plus sign indicates the discoloration of the sheet. A negative fading factor shows that the pulp sheet has whitened or faded. Exposure to sunlight causes both fading and discoloration. All pulp samples, except No. 3 showed a definite yellowing action at the end of three hours. The rate of fading is much slower, but is usually clearly indicated from the data. Not only is it shown by the blancometer, but it can ordinarily be observed with the naked eye, following in the same order as that indicated by the numerical measurement. The discoloration by heat in Cairo is very evident, and there is often a similarity between these results and those obtained by the use of thermometric control at 30 deg. There seems to be little or no relation between the effect of sunlight, and those of ultraviolet light. The latter cannot ordinarily be used to select sunlight-resistant pulps. In general the fading factor is positive where ultraviolet light has been used, and the discoloration (except in the cases of No. 3 and 18B) is high. In general, longer exposures to arc light cause discoloration comparable to, but not as great as, that obtained under ultraviolet light. The value of the fluorescence test is still doubtful, for it is difficult to correlate this with actual changes in the color of the test sheet. S.R.H. Edge and Helen M. McKenzie. Paper Maker and British Paper Trade J. 93 (T.S.) 32, 34-6; 55-7 (1937).

FADING FACTORS

	3	5	8	9	11	16	18B	19
Sunlight 3 hours	−1.7	+4.8	+8.5	+2.5	+10.6	+0.9	—	—
Sunlight 4 weeks May-June		+1.3	−2.4	−11.6	+3.0	+1.3	—	—
Sunlight 4 weeks June-July	−14.7	—	−0.1	−2.8	+0.6	—	−11.4	−4.2
Sunlight and heat 4 weeks Cairo	−9.1	+8.0	+5.4	+0.1	+3.0	+0.4	−6.0	−0.2
Heat 4 weeks Cairo	+1.3	+10.1	+7.1	+6.4	+11.6	+2.1	−0.8	+6.2
30° C., 90% R. H. for 4 weeks	−0.7	+7.5	+6.1	+4.4	+1.2	+2.2	—	—
30° C., 90% R. H. for 6 weeks	+1.8	—	+4.9	+0.6	+2.9	—	−1.3	+3.4
30° C., 90% R. H. for 12 weeks	+1.6	—	+6.4	+8.8	+8.0	—	+3.6	+6.9
Ultra-violet light 4 hours	+1.9	+22.8	+29.0	+24.6	+20.5	+21.6	+11.3	+22.2
Arc light, 2 hours	+1.9	+6.2	+5.5	+4.6	+4.1	+9.2	+3.7	+2.3
Arc light, 8 hours	−1.8	+16.4	+2.7	+15.3	+7.7	—	+9.1	+6.3
Fluorescence test	D.	A.	B.	D.	F.	A.	B.	B.



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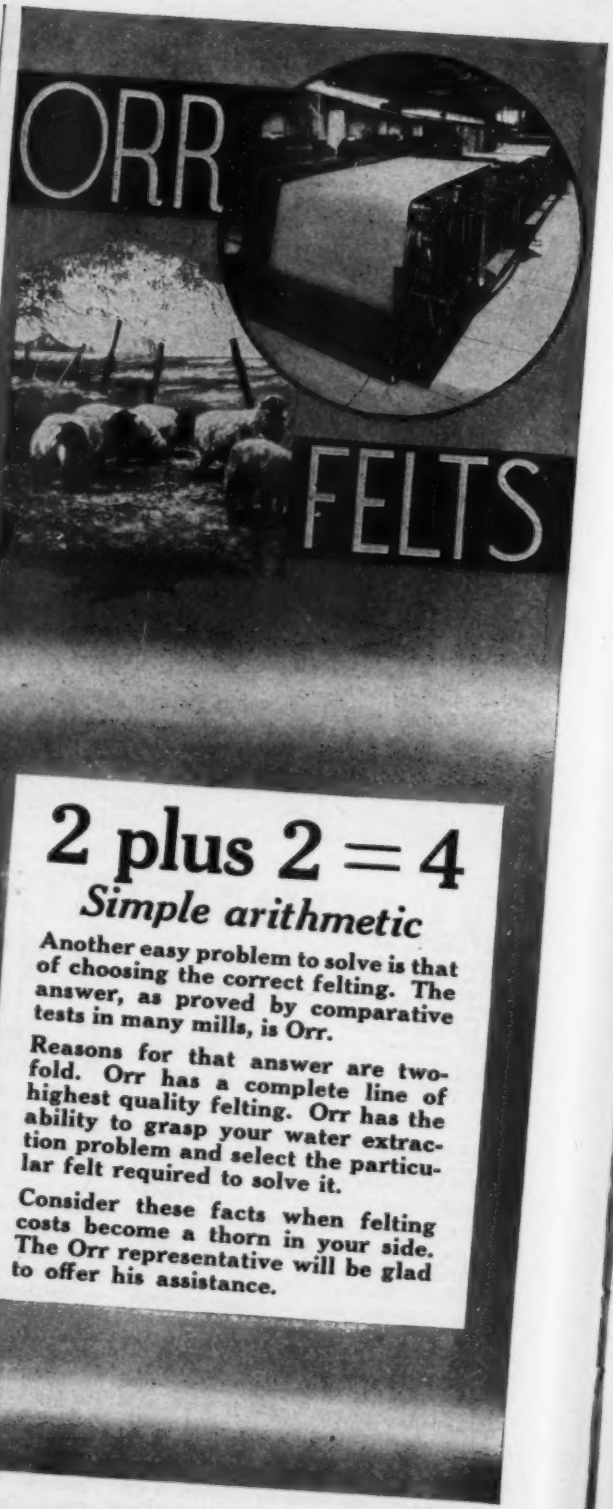

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2,063,299—**Paper Article and Method of Making Same.** George J. Manson, Hawkesbury, Ontario, Canada, assignor of one-half to Nathaniel L. Foster, New York, N. Y. No Drawing. Application June 24, 1931, Serial No. 546,672. 13 Claims. (Cl. 92—21.) In a process of producing paper products, the step which comprises beating trim of a laminated material carrying a light-colored adhesive consisting of a saponifiable natural resin, and an oil selected from the group consisting of mineral and glyceride oils to produce a light-colored reconstituted pulp containing substantially all of the adhesive components from the trim and capable of being sheeted on a paper making machine.

2,069,648—**Paper and Method of Making.** Peter F. Denner, Kalamazoo, Mich., assignor to Kalamazoo Paper Company, Kalamazoo, Mich. Application February 10, 1936, Serial No. 63,182. 9 Claims. (Cl. 91—68.) The method of making paper of the character set forth, comprising the steps of covering both sides of a web of paper with a base coating comprising a mixture of clay, casein and wax, covering said base coating on one side with a coating comprising a mixture of an oxidized metal broken down, casein and wax, polishing said second coating to provide a highly reflecting surface, and covering said reflecting surface with a moisture and grease repellent coating comprising a transparent material such as pyroxylin or cellulose.

2,070,394—**Machine for the Manufacture of Sheet-Paper Blocks.** Etienne Danger, Paris, France, assignor to Société Anonyme Usines Decoufle, Paris, France. Application February 15, 1935, Serial No. 6,739. In France February 16, 1934. 4 Claims. (Cl. 270—41.) A machine of the class described, comprising a frame, a plurality of independent supports for separate reels of paper arranged to be supported at one side of the machine with their axes extending in the direction of length of the machine, guide rollers for training the paper webs upward from their reels and then downwardly, said rollers being mounted on axes parallel with the axes of the reels, other guide rollers, one for each web, positioned below the first named guide rollers for guiding and training the several webs of paper rearwardly of the machine, and additional guide rollers positioned near one end of the machine and about which the webs are trained and by means of which they are caused to travel forward toward the front of the machine, means located in the forward path of travel of the webs for associating them in superposed relation, and means for feeding the superposed webs in a forward direction, all of said rollers, feeding means and web associating means being located on one side of the machine.

2,070,386—**Cutting Apparatus.** Gustave A. Ungar, Pelham Manor, N. Y., assignor to S. & S. Corrugated Paper Machinery Co., Inc., Brooklyn, N. Y., a corporation of New York. Application September 6, 1935, Serial No. 39,397. 22 Claims. (Cl. 164—68.) In a device for cutting sheets from continuous webs, a source of power; a first drive means controlled from said source of power for feeding said web at a substantially constant rate of speed; knife cutting means operating through a cycle, each cycle including a cutting interval during which the knife means engage and cut said web; a second variable speed drive means controlled from said source of power for driving said knife means; a third constant speed drive means controlled from said source of power and operative only during the cutting interval of said knife means for driving said knife means at the constant speed of said web; and spring means interposed between said second drive means and said source of power for permitting said knife means to be driven from said third drive means free from said second drive means.

2,070,742—**Apparatus for Making Pulp or the like.** Homer D. Martindale, Middletown, Ohio, assignor to The Black-Clawson Company, Hamilton, Ohio, a corporation of Ohio. Application October 11, 1935, Serial No. 44,595. 4 Claims. (Cl. 92—20.) In pulp purifying apparatus, a settling trough having a portion for receiving settled impurities, means moving in said trough for carrying settled impurities in the direction of stock flow into said portion, additional means moving in said trough in opposition to the direction of stock flow for moving settled impurities into said portion.

2,071,360—**Waterproofed Paper.** James Reid, Darien, Conn. No Drawing. Application August 7, 1934, Serial No. 738,829. 9 Claims. (Cl. 154—33.) In the art of waterproofing paper, the steps of coating a surface of a sheet of paper with a melted compound pitch having a melting point above normal temperatures and comprising at least 20% of blown stearine pitch, and permitting such stearine pitch to cool and oxidize on the fibers of the paper. In the art of waterproofing paper, the steps of coating one face of each of two sheets of paper with a compound pitch comprising at least 35% of stearine pitch, scraping off excess pitch, squeezing together such sheets while hot and permitting the pitch to cool and oxidize on the fibers of the paper.

2,072,179—**Manufacture of Starch-Sized Papers.** Oscar F. Neitzke, Belmont, Mass., assignor to Bennett Incorporated, Cambridge, Mass., a corporation of Massachusetts. No Drawing. Application March 23, 1935, Serial No. 12,732. 7 Claims. (Cl. 92—21.) In the production of starch-sized papers involving the incorporation of an aqueous starch composition into the paper, that practice, prior to incorporation of the composition into the paper, which comprises alkalinizing the composition to swell the starch granules therein and to form a gelatinous solution of high starch content, diluting the solution with water to a starch content not less than about ½%, and adding an acidic reagent in amount substantially to neutralize the solution while it is a starch content not less than about ½%.

2,073,208—**Paper Waxing Apparatus.** Ralph A. Hayward, Parchment, Mich., assignor to Kalamazoo Vegetable Parchment Company, Parchment, Mich. Application April 6, 1934, Serial No. 719,243. 18 Claims. (Cl. 34—48.) An apparatus for removing water from waxed paper consisting of means acting to transform films of water on the web into globular form, and suction means for removing the globules of water.

2,073,654—**Paper Manufacture.** Lloyd D. Smiley, Dayton, Ohio, assignor to The Smiley Industrial Filter Company, Dayton, Ohio, a corporation of Ohio. Application April 14, 1930, Serial No. 444,113. Renewed June 11, 1934. 25 Claims. (Cl. 92—39.) In the manufacture of paper and the like, the method which comprises introducing a fibrous stock upon a perforate traveling member, the liquid in the stock draining through the perforate traveling member while the fibrous material is caught by the member to form a fibrous web thereon, moving the traveling member with the web thereon beneath a maintained pool of effluent and supporting the pool upon the formed web carried by the perforate traveling member, the liquid of the effluent draining through the web and the perforate member as the suspended solid materials of the effluent are caught by the web and filtered from the liquid, removing the perforate member with the web carried thereby out of the maintained pool of effluent, directing fluid jets upon the perforate traveling member to remove the formed web and filtered material therefrom, directing additional fluid jets upon the perforate traveling member to remove additional material adhering thereto, and returning the removed additional material to the pool of effluent to be

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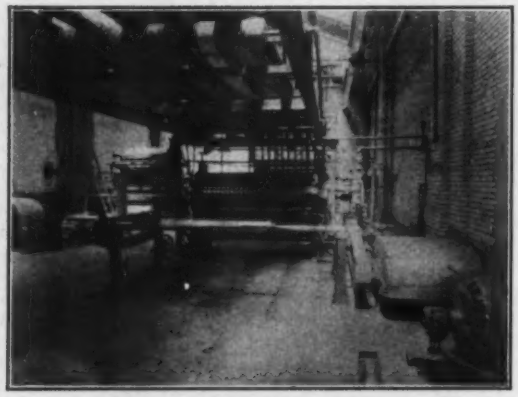

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refiltered. The method of washing and thickening pulp stock, which comprises introducing pulp stock upon a traveling wire to form a mat thereon, moving the traveling wire with the mat carried thereby out of the mat forming zone, and subjecting the formed mat alternately to washing liquid sprays directed downwardly upon the mat and fluid jets directed upwardly through the wire to partially dislodge the mat thereon while subjecting the mat to suction.

2,073,762—Safety Paper and Method of Making the Same. Burgess W. Smith, Rochester, N. Y., assignor to The Todd Company, Inc., Rochester, N. Y., a corporation of New York. No Drawing. Application August 22, 1932, Serial No. 629,888. 4 Claims. (Cl. 91—67.95.) A safety paper containing a salt of p,p'-diaminodiphenylthiourea adapted to react to produce a visible discoloration upon the application of a chemical ink eradicator.

2,073,763—Safety Paper and Method of Making the Same. Burgess W. Smith, Rochester, N. Y., assignor to The Todd Company, Inc., Rochester, N. Y., a corporation of New York. No Drawing. Aplication August 22, 1932, Serial No. 629,889. 4 Claims. (Cl. 91—67.95.) A safety paper containing a salt of p,p'-diaminodiphenyl sulfide.

2,073,780—Machine for Applying Foil to Paper. Frank E. Brooks, Batavia, N. Y., assignor to Ray D. Brooks, Jamestown, N. Y. Application August 16, 1933, Serial No. 685,400. 7 Claims. (Cl. 154—35.) In a machine for producing foil coated paper, paper supply means, a horizontal adhesive roll, a pan containing a sticky adhesive into which said roll dips, a horizontal roller arranged immediately adjacent each side of said adhesive roll and parallel therewith, means for passing the paper from said supply means under one of said rollers, the bottoms of said rollers being a substantial distance below the top of said roll whereby a larger area of said paper is brought into contact with said roll, over and around the periphery of said adhesive roll and under the other of said rollers, means for driving said adhesive roll to provide a peripheral movement in the direction of travel of said paper and at a slightly higher peripheral speed than the rate of travel of said paper whereby the adhesive on said roll is wiped against said paper and means for applying foil to the coated side of said paper after leaving said last named roller.

2,074,045 — Rope Guard for Paper Making Machines. Russell Carpenter, Wayagamack Island, Three Rivers, Quebec, Canada. Application November 1, 1935, Serial No. 47,883; in Canada, November 3, 1934. 5 Claims. (Cl. 34—38.) In a paper making machine the combination of a rotary dryer roll having a peripheral groove, carrier ropes arranged to run in said groove, and a rope guard for preventing displacement of the ropes from said groove, said guard comprising a front wall lying perpendicular to the periphery of the roll immediately in front of the groove and side walls projecting rearwardly over the groove to form a channel in which the ropes are received and held against displacement from the groove, said front wall gradually diminishing in width toward the point where the ropes enter the groove.

2,074,237—Automatic Break-Off Mechanism. Harold E. Pierce, Menasha, Wis., assignor to Marathon Paper Mills Company, Rothschild, Wis., a corporation of Wisconsin. Application May 11, 1935. Serial No. 20,995. 5 Claims. (Cl. 91—14.) An apparatus for continuously treating web material comprising a delivery roll for supporting a roll of web material to be treated, braking mechanism on the delivery roll, a receptacle containing a treating substance through which said web is continuously passed, severing means positioned intermediate the said delivery roll and said receptacle for severing said web, means for drawing forward said web under tension, an emergency contact member responsive to abnormalities in the tensioning of said web due to accidental breakage of said web and movable from normal position when said breakage occurs, means responsive to movement of said contact member from said normal position for actuating said severing means and means for substantially simultaneously effecting actuation of the braking mechanism for stopping rotation of said delivery roll to prevent excess feeding of said web material into said receptacle.

2,075,538—Safety Paper. John Wallace Neff, New Rochelle, N. Y., assignor to Milton C. Johnson Company, New York, N. Y., a corporation of New York. No Drawing. Application August 2, 1932, Serial No. 627,300. 4 Claims. (Cl. 91—67.95.) A safety paper having a light, normally substantially imperceptible surface application comprising dehydrothio-para-toluidine.

2,075,679 — Container and Method of Making Same. Isadore H. Weber, Philadelphia, Pa., assignor to David Weber & Co., Philadelphia, Pa., a corporation of Pennsylvania. Application December 6, 1935, Serial No. 53,244. 4 Claims. (Cl. 93—45.) The method of making container bodies, consisting of forming a continuous run of composite board having a plurality of corrugated wall thicknesses wherein one wall thickness is of less width than others and secured to the latter throughout its entire width, cutting sections of board from said composite run at predetermined intervals transversely thereof to form container blanks having one wall thickness of less width than others which project a predetermined distance beyond one side edge of the former, scoring said blanks at predetermined intervals transversely thereof, and forming container bodies from the blanks by bending the same along the several scores therein so that the opposite end edges thereof abut and the respective wall thicknesses cooperate to form a shoulder and projecting sleeve portion adjacent at least one end of said bodies.

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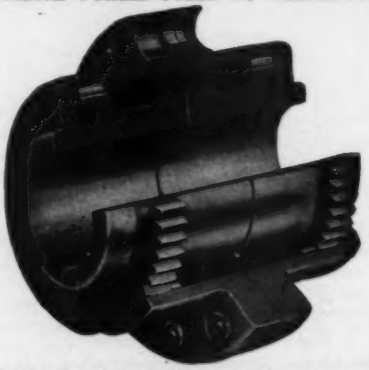

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The COMMERCIAL OUTLOOK

New York, June 1, 1937.

UNDOUBTEDLY demand for paper has simmered off to some extent and the market rules quieter, yet paper manufacturers as a group are well supplied with orders and continue to operate their plants at an active pace. Most mills have a considerable backlog of business, and are steadily receiving new orders for no small aggregate tonnage of their product, thereby justifying production on a scale in excess of that ordinarily seen at this time of the year.

The industry is in a healthy state. The slowing down of demand came at a time when it actually was welcomed by paper manufacturers. Had it kept up at the rate witnessed for several months, there is no saying what may have happened in the way of a piling up of unfilled orders. A satisfying feature is that the subsiding of paper demand is not a development only within the paper industry. Practically every commodity is affected; something akin to a mild buyers' strike suddenly was inaugurated, as purchasing agents and most other buyers began to retrench in their purchases, almost in unison, following the period of brisk absorption of goods in volume perhaps never before quite equaled in peaceful eras. The cessation of buying is viewed as a natural sequence to the broad activity recorded in virtually all commodity markets in the closing months of the last year and early part of this year.

There is a well-defined opinion in paper trade circles that manufacturing will continue on a comparatively large scale all through the approaching summer. This view is founded on the sizable volume of orders which mills still have to fill, their large contract commitments, and the fact that paper consumption has increased so substantially it will be necessary for buyers to acquire supplies almost without interruption. On the other hand, there are those who are of the belief the quieting of the market will reach further lengths during the next couple of months; that the customary summer lull in demand for paper and board will prove more pronounced than ordinarily, to flare up again in the early fall on probably an even wider scale than yet has been known.

The strong tone in prices of paper and the higher tendency in mill quotations is expected to be a factor which will stimulate buyers' absorption of supplies, in spite of the summer vacation. It is an axiom that commodity buyers always endeavor to "beat" a price advance, and rises in the various classes of paper recently, announcements of increases in contract bases to come later, and the strong pointing of prices upward probably will attract numerous consumers, converters and jobbers to the market to cover all their needs promptly and to anticipate requirements.

Latest issued statistics relating to paperboard production and orders show gains that are nothing short of astounding. The Census Bureau summary discloses that board mills of the country produced a total of 428,506 tons of board in the month of March, a new all-time monthly record and comparing with 373,431 tons in the month preceding and 285,257 tons in the similar month last year, an increase of 50.2 per cent over the same 1936 month. Output of board during the first three months of the current year reached 1,167,602 tons, also a new high record and representing a rise of 340,028 tons or 41.0 per cent above the 827,574 tons in the corresponding period of 1936, and 377,936 tons or 47.8 per cent in excess of the 789,666 tons produced in the first quarter of 1935.

Board mills produced at 91.6 per cent of their rated capacity in March last, or very close to maximum, contrasted with 90.0 per cent in February this year and 69.4 per cent in March a year ago. Three months' output this year was at 87.9 per cent of mills' capacity, against 67.0 per cent in the same period last year and 66.8 per cent in 1935. New orders received by manufacturers in March called for a total of 453,621 tons of board, or well in excess of the month's production, and comparing with 386,781 tons in the month preceding, and 290,854 tons in March, 1936. In three months this year, board mills booked orders for 1,248,118 tons of their product, contrasted with 844,551 tons in the corresponding time last year, and 794,089 tons in 1935. Unfilled orders held by manufacturers at the end of March last were for 265,575 tons of board, or very nearly as much board as was produced in the month of March, 1936, and showing a tremendous climb from 96,202 tons held at the close of March last year.

North American newsprint mills produced 13.1 per cent more newsprint in April than in the same 1936 month, according to figures reported by the News Print Service Bureau. Canadian output was at an all-time high for April, as was the combined United States and Canadian production, being exceeded only by March, 1937, and October, 1936.

Canadian mills produced 298,347 tons of newsprint in April, against 258,721 tons in April, 1936, an increase of 39,626 tons or 15.3 per cent. Production of United States mills was 78,642 tons, compared with 76,470 tons a year ago, a gain of 2,172 tons or 2.8 per cent, and making the combined total for both countries 376,989 tons, contrasted with 335,191 tons in April last year, a rise of 41,798 tons or 12.5 per cent. Newfoundland output in April was 30,793 tons, against 25,224 tons a year ago, an increase of 5,569 tons or 22.1 per cent. Total North American production was 407,782 tons, compared with 360,415 tons in April last year, a gain of 47,367 tons or 13.1 per cent.

Four months' newsprint output in Canada this year reached 1,162,680 tons, a gain of 210,535 tons or 22.1 per cent over the same period last year. United States production was 313,295 tons in four months, a rise of 8,705 tons or 2.9 per cent, while total North American production was 1,593,652 tons, an increase of 237,203 tons or 17.5 per cent over a year ago.

Prepared roofing shipments from manufacturing plants in the United States during March amounted to 2,328,656 squares, a seasonal decline from 3,588,887 squares shipped in the month preceding, and compared with 2,447,182 squares in March last year. Shipments in the first three months of the current year aggregated 8,303,771 squares, against 7,245,083 squares in the corresponding time of 1936, and 4,223,365 squares in 1935.

◆ ◆

◆ Peter Larsen

Peter Larsen, a member of the firm of Lorentzen and Wettre, paper machinery importers of Oslo, Norway, died May 26 in that city at the age of 80.

Mr. Larsen is well known in the United States, having been associated with several paper mills in this country. Upon returning to Norway, he became a member of the firm of Lorentzen & Wettre. Mr. Larsen is survived by a son and daughter, residing at Albany, N. Y., and by two sisters, residing at Oslo.

◆ THE NEW YORK OFFICE of the C. O. Bartlett and Snow Company, Cleveland, Ohio, has been moved to Room 404-E, 30 Church Street. C. W. Ross, who has been with the company twelve years, representing their line of foundry, drying, conveying and coal and ash handling equipment, will continue in charge of the new office.

◆ ACTIVELY ENGAGED in the management of General Refractories Company since 1933, S. M. D. Clapper was recently elected chairman of its board of directors. Mr. Clapper is also chairman of the board of directors of Schlichter Jute Cordage Company, Philadelphia; a director of the Central Penn National Bank; Fire Association of Philadelphia; Guaranty Company of North America; Reliance Insurance Company of Philadelphia; and Delaware County National Bank of Chester, Pa. He is also vice-president of Cannon Mills Inc. and treasurer of Ewing Thomas Corporation, Chester, Pa.

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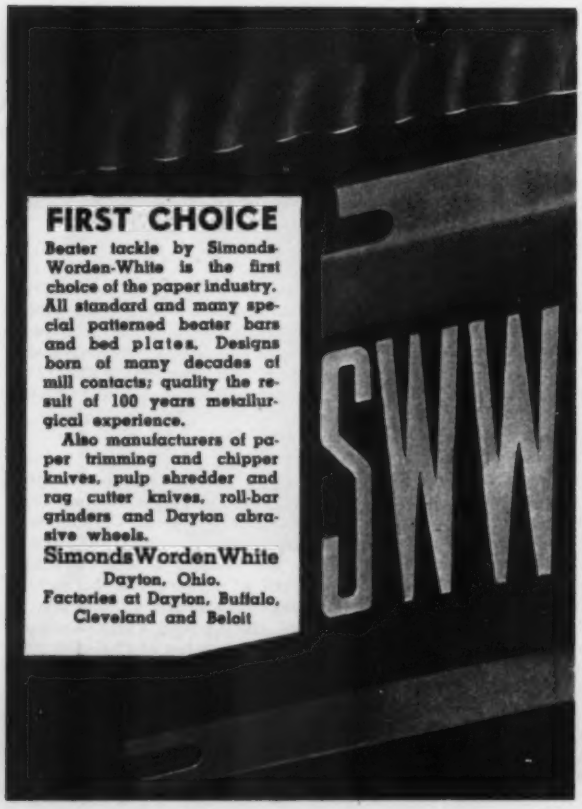
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Domestic RAW MATERIALS

◆ Papermaking Rags

The papermaking rag market has turned decidedly quieter. Apparently consuming mills, or most of them, have accumulated stocks sufficient to tide them over a time and, with the trend in rag prices downward as ordinarily is the case at this season when collections run large and paper manufacturers retrench in buying while preparing for the Summer lull, evince limited disposition to purchase other than to satisfy urgent needs. The recession in prices is orderly and gradual, yet during the last month some classes of rags have registered appreciable decline.

It seems something of a paradoxical situation with paper mills fairly active and consuming rag stock until at least recently in heavy tonnage that the rag market should be pointed downward. The reason for this evidently is that rag supplies have increased to an ample extent to create a surplus of rags, temporarily at any rate. In short, paper mills and more particularly roofing felt plants which use rags in very large volume have piled up sizable stocks, having for a considerable time acquired supplies in excess of their current consumption. Thus, with demand having slowed down perceptibly, prices of many or most grades of papermaking rags have moved off from the high levels reached a few months ago, and appear headed for still lower levels before the downward slide is checked.

New cuttings and the higher grades of old cotton rags, as well as roofing stock, are easing in value. Reports say that No. 1 new white shirt cuttings are obtainable at 9.25 cents per pound f.o.b. dealers' points, new unbleached muslins at 10 cents, fancy shirt cuttings at 4 cents, No. 1 washables at 3 cents, blue overall cuttings at 7.50 cents, light silesias at 7 cents, light flannelettes at 7.50 cents and soft black silesias at 4.50 cents. Perhaps some of these can be bought at slightly under the prices mentioned. New white linen cuttings are quotable at 12 cents and new grey linen at 11.50 cents per pound at shipping points.

Roofing rags have decreased in cost to where mills are reported buying No. 1 domestic roofing stock at 1.60 cents a pound f.o.b. eastern points, and No. 2 grade at 1.40 cents to probably a shade less. There is practically no activity whatever in imported roofing rags. The European market is substantially higher than our market, and importers say they find it next to impossible to buy abroad and dispose of the material to felt manufacturers in this country at the prices the latter care to pay and even so much as break even. Foreign dark colored cottons are said to cost a minimum of about 1.90 cents a pound on current purchases in northern Europe landed at American Atlantic ports, and linsey garments 2.15 cents landed, and felt manufacturers exhibit no readiness to meet these prices.

Old white cottons are 3.50 cents a pound upwards at shipping points for No. 1 repacked quality and 3 cents for No. 2 repacked, while repacked twos and blues are 2.25 cents and repacked thirds and blues 2 cents per pound.

◆ Old Paper

Waste paper prices show a great deal of irregularity and have receded in most instances to lower levels. The market in the Middle West appears easier than in the East, apparently due to board and other consuming mills having accumulated large stocks and letting down in their purchases. Nevertheless there are cases where some board manufacturers are seemingly aiming to sustain prices, and are paying substantially more money for the old paper they are buying than are other consumers. A case in point exists in the East, where certain large board manufacturers are granting $2 a ton more for mixed paper and folded newspapers than are competitive buyers. High grades in general have developed a softer tone and have moved a little off in price.

No. 1 mixed paper in the East is 55 to 65 cents per hundred pounds f.o.b. shipping points, folded news at 62½ to 72½ cents per hundred pounds, and old corrugated boxes 85 to 90 cents. Midwestern quotable bases are 60 cents for mixed paper, 65 cents for folded news and 82½ cents for old corrugated, f.o.b. dealers' points. It has been a long time since market levels in the West have been lower than in the East, such as now exists. Book stock is firm in the East at 1.35 cents a pound f.o.b. shipping points for No. 1 heavy magazines, and ledgers are freely bringing 1.80 to 1.90 cents a pound for all-white and 1.60 to 1.65 cents for colored. Shavings are 2.75 to 3 cents per pound for No. 1 hard white, 2.40 to 2.50 cents for No. 1 ordinary soft white, and 2.80 to 2.90 cents for one-cut soft white. Hard white envelope cuttings of No. 1 quality continue to sell around 3.10 cents a pound at shipping points.

◆ Pulpwood

Pulpwood is being readily taken by consuming plants, and there is a fairly active open market call for additional supplies. Prices are firm, and very little available unsold wood is in the market, it is stated.

◆ Mechanical Pulp

Mills producing mechanical wood pulp are well sold up, have almost no tonnage to offer to other than regular customers and from all indications could easily dispose of substantially larger amounts of pulp if they had it to sell. The price tone is steady to firm, and there is no sign of any bargain groundwood to be had. As a matter of fact, consumers appear to be looking more to domestic and Canadian sources to fill their groundwood needs while enabled to buy such pulp at more favorable prices than European groundwood, with the result there is more market activity in mechanical pulp produced on this Continent than in Scandinavian groundwood. Domestic and Canadian prime moist groundwood is bringing $35 to $37 a ton, on an average, delivered to consuming mills in the northern United States, depending of course on the freight haul from grinding centers. Canadian producers quote $34 or $35 a ton ex dock American Atlantic ports for groundwood brought down by schooners, and approximately $25 to $26 f.o.b. pulp mills in the Dominion.

◆ Rope and Bagging

Following some spotty buying by individual consuming mills totaling fair amounts of material, both old rope and scrap bagging have quieted, and the markets for these papermaking stocks are now showing little else than strict routine activity. Quotations of mills on old manila rope have been reduced to 5 cents per pound f.o.b. points of shipment for No. 1 domestic rope, and most mill buyers refuse to pay in excess of this also for No. 1 foreign rope. So little business is doing in scrap bagging that prices are uncertain at around 1.90 cents a pound at shipping points for No. 1 domestic bagging, 2.30 cents for No. 1 domestic gunny and 1.30 cents for roofing bagging. Foreign bagging is generally quoted at well above these prices, with importers asserting that purchases abroad are well nigh impossible to effect at costs comparable with market levels here.

◆ Chemical Pulp

Prices on domestic wood pulp are a nonentity in the sense that it is just about impossible to purchase domestic pulp in the open or spot market. Producing mills in the United States are sold out to contract customers, and have scarcely a pound to dispose of. They could undoubtedly market tremendous amounts of pulp at prices they are maintaining on contracts if they had the pulp to offer. Second-quarter contract bases remain 2.90 cents per pound for bleached sulphite, and 2.30 cents upwards on unbleached sulphite, ex dock American Atlantic ports. There is much speculation as to what third quarter prices will be, and general agreement they will be higher. Domestic bleached soda pulp is 2.90 cents delivered consuming mills, and domestic kraft pulp 3.25 cents upwards at pulp mills.

◆ Chemicals

Manufacturers of papermaking chemicals are firmly maintaining quotations, and are making shipments regularly against contracts. There is also a fair spot demand from consumers filling in requirements. No changes of note have occurred in ruling market levels.

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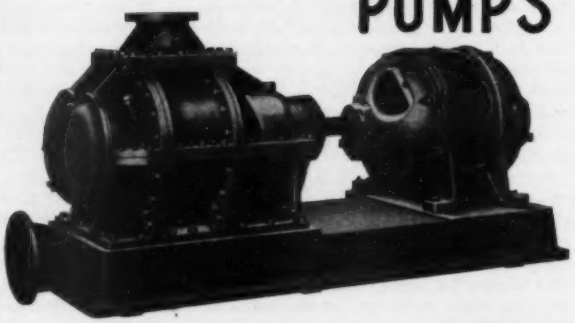

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Import and Export MARKETS

IMPORTS

◆ Wood Pulp

Importations of wood pulp into the United States are on the road toward establishing another new high record this year, judging from official Government figures for the first quarter of 1937. During March, imports amounted to 151,839 short tons, air dry weight, of chemical pulp of a value of $6,529,732, making a total for the first three months of the current year of 533,688 short tons, valued at $20,995,148, against 462,641 short tons of a declared value of $17,617,225 imported in the corresponding period of 1936, according to U. S. Department of Commerce reports. In the last calendar year, all previous records of wood pulp imports were surpassed.

While the March chemical pulp imports were smaller than in the several previous months—a seasonal condition due to closed navigation over the Baltic Sea—they were well above the total receipts in the same month last year. February last imports of chemical pulp were 191,204 short tons of a value of $7,476,222, and in March, 1936, were 128,249 tons valued at $5,072,658. March last imports included 50,397 short tons of unbleached sulphite of a value of $1,787,625; 47,070 tons of bleached sulphite, valued at $2,583,753; 42,801 short tons of unbleached sulphate, valued at $1,482,156; 10,704 tons of bleached sulphate, valued at $631,794, and 848 tons of soda pulp of a value of $40,117. Groundwood imports in February this year were 15,262 tons of a value of $287,856, and in March a year ago were 18,265 tons valued at $303,441.

Should the average of 177,896 short tons of chemical pulp monthly imported in the first quarter of the current year be maintained throughout 1937, total importations of such pulp would reach over two million 2,000-pound tons, or to be exact, 2,134,752 tons. Mechanical pulp imports would total 196,872 short tons for the year, if the first-quarter average is maintained.

There are visible indications that demand for wood pulp has let down to some degree. A combination of factors apparently is responsible. First, with activity in the paper and board market having subsided to at least a seasonal extent, manufacturers are less eager to purchase pulp temporarily because their requirements are not so pressing. Second, it is likely that a great many paper and board manufacturers — probably a large majority—have covered their needs well enough for a time to enable them to retrench in buying for the present. Third, numerous pulp consumers have found through experience in recent months that available supplies of pulp are so difficult to locate in the positions desired, and of the grades principally wanted, they are in part discouraged and have let up in their search for additional tonnage. Fourth, there are evidences of the pronounced pinch in pulp requirements having been relieved to some extent, and of consumers coming around to the belief that a better policy is not to anticipate possible requirements too far ahead, more particularly as concerns kraft pulp owing to the tremendous increase in production in new southern mills expected in the not distant future.

At the moment, bleached sulphite appears in equally as strong a market position as ever, whereas unbleached sulphite and kraft pulps seem in a bit softer situation. There has been no recession whatever in quoted prices; instead sellers are still sitting in the saddle and are demanding and securing prices at the top or close to top quotational levels.

It is nothing out of the ordinary for producers abroad to ask 5 cents per pound, and even up to 5.25 cents, for prime bleached sulphite for shipment during the remainder of this year on a landed basis at American Atlantic ports. Actual market prices, however, range from approximately 4.25 to 4.75 cents a pound ex dock Atlantic seaboard. Prime easy bleaching sulphite is around 4 cents per pound, ex dock basis; prime strong unbleached sulphite 3.50 to 3.75 cents, and prime strong Scandinavian kraft 3.50 to 3.75 cents for this year's shipment and 3 to 3.25 cents for 1938 delivery. It is reported that latest figures go to show that 75 per cent or more of the expected 1938 output of kraft pulp in Europe has been disposed of on contracts. Spot lots of prime kraft are said to have been sold up to 3.85 cents per pound ex dock Atlantic seaboard.

Quotations on foreign groundwood are above a parity with domestic and Canadian mechanical pulp prices. Producers in Europe want $40 and higher for prime dry groundwood for 1938 shipment on contract, ex dock American Atlantic ports, and ask $38 to $39 per short ton for current shipments of dry and $37 to $38 for moist groundwood.

◆ Paper Stock

Imports of papermaking rags into the United States in March amounted to 23,047,847 pounds, valued at $430,364, according to U. S. Commerce Department reports, making a total for the first quarter of this year of 71,288,427 pounds of a declared value of $1,384,849, contrasted with 65,675,894 pounds of a value of $914,504 imported in the first three months of 1936. Imports of miscellaneous paper stock, comprising old rope, bagging, waste paper, etc., were 11,655,825 pounds for a value of $213,076 in March last, and for the first three months of the year 31,209,735 pounds of a value of $602,829, against 29,113,960 pounds of a value of $474,104 in the same period a year ago.

◆ Paper

Imports of paper and paper products into the United States are registering a steady gain over a year ago, amounting in value to $11,246,870 in March, making a total for the first quarter of this year of $29,400,143, against $22,315,239 last year, according to U. S. Department of Commerce statistics. Newsprint comprised the great bulk of these imports, reaching an aggregate value of $26,009,286 in the first three months of the current year, against $19,189,562 a year ago. Cigarette paper, the next most important item, was valued at $960,441 in the first quarter of 1937, compared with $843,459 last year in the same time.

EXPORTS

Exports of paper and paper products from the United States show a consistent climb, in point of total value, over shipments a year ago. During March last, they reached a total valuation of $2,797,047, according to U. S. Department of Commerce figures, bringing the aggregate for the first three months of this year up to $6,799,326, contrasted with $5,419,331 in the initial quarter of 1936. This was an increase this year of 25.2 per cent.

Exports of newsprint paper were valued at $124,118 in the first three months of 1937, against $205,322 in the same 1936 period; of uncoated book paper, $393,434, against $188,800; of writing paper, $772,695, against $514,199; of wrapping paper except kraft, $508,624, against $441,267; of kraft wrapping, $74,936, against $31,032; of tissue and crepe paper, $245,280, against $146,381; of toilet paper, $216,285, against $169,455; of fiber insulating board or bat, $490,373, against $320,436; of boxboard, $348,344, against $397,587; of other paperboard, $304,892, against $246,299; of paper bags, $306,550, against $200,484, and of paper boxes and cartons, $202,592, against $159,054.

Exports of paper base materials in the first three months of this year reached a value of $2,851,485, comparing with shipments valued at $1,804,789 in the similar time last year.

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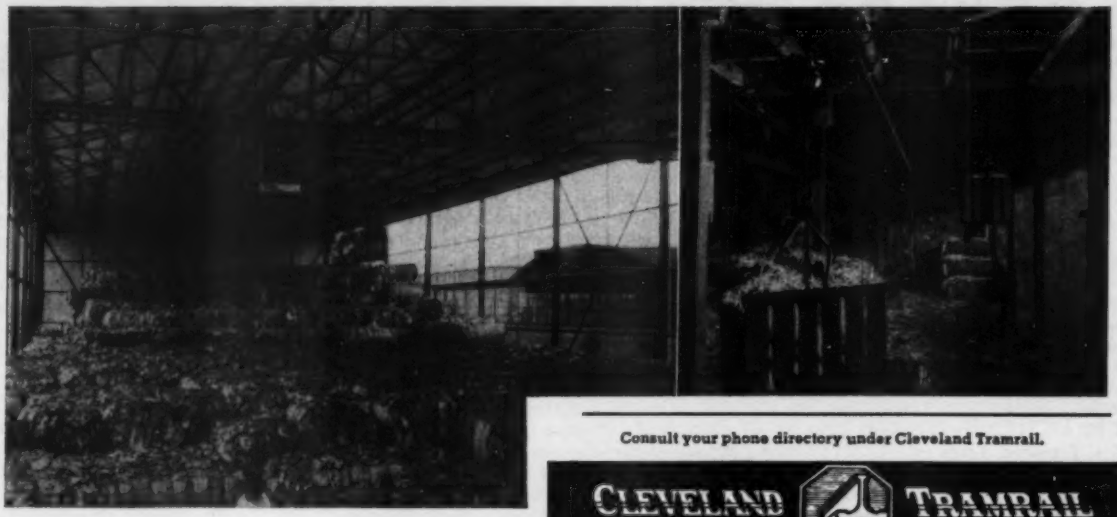
OVERHEAD MATERIALS HANDLING EQUIPMENT



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